IBM VisualAge® for Java™, Version 3.0

# Team Programming

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# Contents

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# Chapter 1. Team development concepts

## Team development - overview

VisualAge® for Java™, Enterprise Edition, provides a collaborative team development environment based on a shared repository. Change control works at the object level; it is based on object ownership.

**Shared repository on a server**
In the team development environment, all source code is stored in a shared repository on a server. Team members connect from their clients to the shared repository. Once connected, they can perform the following tasks:

- Find program elements in the shared repository, including those developed or owned by other team members
- Bring various editions of those program elements into their workspaces
- Create, change, test, and version program elements
- Release editions of program elements *that they own* for other team members to use as a common baseline
- Selectively replace editions of program elements in their workspace with other editions released by other members of the team

**Change control based on ownership**
In the VisualAge for Java team development environment, every project, package, and class has one person who is responsible for the quality of that program element, and who has the most authority over it. That person is the program element's owner.

For example, any number of developers may work on the same class, each in their own timestamped editions, but it is the owner of the class who compares their editions, merges their work to create a single version, and then releases the new version into its containing package. (Releasing updates the containing package with the new version of the class and indicates to other team members that this is a good baseline to work from.)

Similarly, packages and projects can only be versioned or reopened by their owners. Owners control the mainstream of development for their program elements.

For links to more information on program element ownership and team roles, see the related concepts listed at the end of this document.

**Comparison with other source configuration management (SCM) systems**
VisualAge for Java, Enterprise Edition, is different from other team development environments in the following ways:

- Team developers do not reserve or "check out" program elements, so program elements are always available to everyone on the team.
- There is no need to "check in" a program element after changing it. Incremental changes are immediately saved in the shared repository.

- Anyone on the team can access and modify any program element for development, testing, and debugging purposes, regardless of who owns the program element. This facilitates code reuse and collaborative development.
- Change is managed at the object level rather than at the file level. This facilitates parallel development of classes by more than one developer.
- Program element owners approve changes by releasing them into the team baseline. There is an emphasis on roles and responsibilities assumed by the team, rather than on file locking performed by the software.

VisualAge for Java's team features are optimized for object-oriented development in fast-moving, iterative, prototyping development environments. They are flexible and offer a high level of programmer productivity, while also providing stability.

For a more detailed discussion of setting up the team development environment, see the IBM® redbook, *VisualAge for Java Enterprise Team Support* (SG24-5245-00). For information on VisualAge for Java books, select the **Library** link at http://www.software.ibm.com/ad/vajava/.

**Using external SCM tools**

VisualAge for Java also offers an interface to other software configuration management (SCM) programs, including:

- ClearCase for Windows NT®, from Rational Software Corporation
- PVCS Version Manager, from INTERSOLV, Inc.
- VisualAge TeamConnection®, from IBM Corporation
- Visual SourceSafe®, from Microsoft

External SCM tools are accessible from a menu, which you can use to add classes to source control, check classes in and out of the SCM repository, and import the most recently checked-in version of a class from the SCM repository.

If you select the interface to external SCM tools when you install VisualAge for Java, you can use the **External SCM** menu for convenient access from the VisualAge for Java IDE to an existing SCM tool. *There is no relationship* between external SCM functions and the version control provided by VisualAge for Java. If you use another SCM tool to manage program elements developed in VisualAge for Java, you will have to correlate the names, contents, and versions of program elements in the two systems.

**RELATED CONCEPTS**

Team client/server configuration
Repository
Editions and versioning
Ownership and team roles - overview
Baselines, releasing, and reloading
Team development scenarios - introduction
Sample life cycle of an application
External SCM tools

**RELATED TASKS**

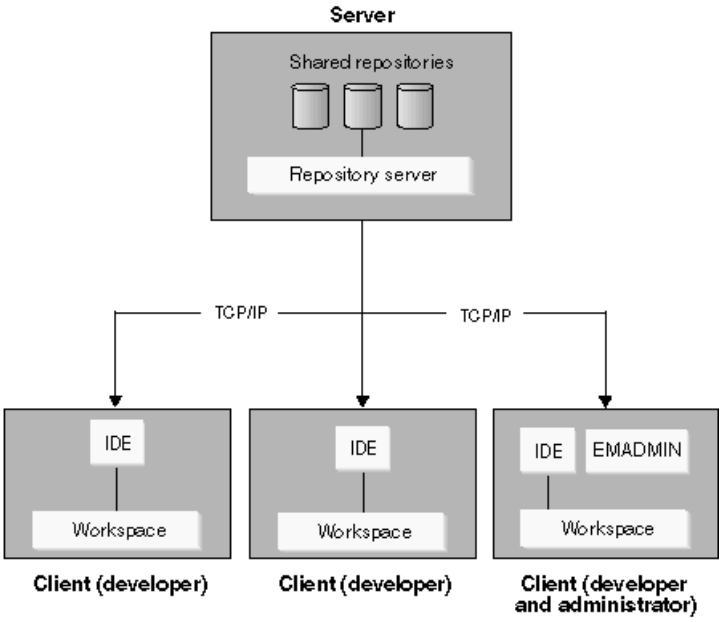
Setting up a team server - overview

**RELATED REFERENCES**

Repository files

## Team client/server configuration

The following drawing shows the client and server components that make up a VisualAge for Java team development environment.




Example of a VisualAge for Java team network

Connectivity is provided by a TCP/IP network.

Any computer where a shared repository will reside must be a server, which is to say it must run the repository server program (EMSRV). There may be more than one server in your environment. Each server has the following components:

- One or more source code repositories (.dat files), shared by the team
- The repository server (emsrv.exe, emsrv.nlm, or emsrv). This program manages concurrent client access to the shared repositories on the server.

VisualAge for Java clients have the following components:

- The Integrated Development Environment (ide.exe)
- A workspace (ide.icx)
- Optionally, a local repository (.dat file) for offline development
- The EMADMIN utility (emadmin.exe), which is most commonly used by the person responsible for operating the repository server, for example to check the server's status

**RELATED CONCEPTS**

Team development - overview
The repository server (EMSRV)
Repository
Workspace
Overview of the VisualAge for Java IDE

**RELATED TASKS**

Setting up a team server - overview

**RELATED REFERENCES**
The EMADMIN utility - overview
EMSRV restrictions

## The repository server (EMSRV)

EMSRV is the program that manages concurrent access to shared repositories on the server. It uses native locking calls to manage file input/output requests against the repository files on the server.

The administrator must start the repository server, using the **emsrv** command, before clients can can connect to the shared repository. The administrator uses the EMADMIN utility to manage the repository server.

**The EMSRV working directory**
The EMSRV working directory is the default directory that the repository server uses to locate shared repositories when, for example, a team member is changing repositories or importing from another repository. The repository server also writes its log in the EMSRV directory.

For ease of use, it is recommended that you store all shared repositories in the EMSRV working directory. This allows team members to connect to shared repositories without providing path information.

Refer to the related topics below for more information on EMSRV, including supported operating systems and changing the EMSRV working directory.

**RELATED CONCEPTS**
Team development - overview
Team client/server configuration
EMSRV user
Repository administrator
Server considerations in team development
Server files and directories
Server security

**RELATED TASKS**
Starting the repository server on Windows NT
Starting the repository server on OS/2®
Starting the repository server on AIX®, HP-UX, or Solaris™
Starting the repository server on NetWare
Changing the EMSRV working directory

**RELATED REFERENCES**
Repository files
EMSRV restrictions
EMSRV startup parameters
The EMADMIN utility - overview

## Editions and versioning

In VisualAge for Java, whenever you work with any project, package, or class, you are actually working with a specific *edition* of that program element. At any time, you can only have one edition of each program element in the workspace. To see which editions are in the workspace, click the Show Edition Names  button.

[ENTERPRISE] You will usually work with open and versioned editions; occasionally, you may also create scratch editions of program elements to experiment with. You will periodically release editions of classes and packages that you have been working on, to provide a baseline for the team and to make your changes easily available to them. Editions, releasing, and ownership are all fundamental to managing application changes in the team environment. Editions are discussed below; releasing and ownership are discussed as separate topics.

**Open editions**

Open editions are works in progress. Before you can make changes to an existing project, package, or class, you must create an open edition of it. The Workspace can only contain one edition of a program element. In the repository, however, you can have multiple open editions of the same program element, with each one implemented differently. For example, if you are adding features to an application that you have customized for different industries, you might have multiple open editions of a package with the same name stored in the repository.

Open editions appear in VisualAge for Java windows with a timestamp, in parentheses, showing when they were created. Here is an example:

```
PackageA (3/28/98 4:21:15 PM)
```

**Versioned editions**

Versioned editions are editions that can not be changed. You version your open editions for the following reasons:

- To keep a copy of a program element at some meaningful point, so you can return to it at a later date. In the case of packages and projects, versioning freezes a specific configuration of the contained program elements, which must also be versioned.
- [ENTERPRISE] To make your changed classes available to other team members who are browsing the repository.
- [ENTERPRISE] To release a class into its containing package, thereby updating the team baseline. Classes must be versioned before they can be released.

Versioned editions appear in VisualAge for Java windows with version names, as opposed to the timestamps that identify open editions. When you version an open edition of a program element, VisualAge for Java can automatically assign a name for you, or you can specify your own name. Here are some examples of versioned editions:

```
PackageA 1.6.1
PackageB VersionBRel2
PackageC JS - Fixed print problems for CustomerX
```

Versioning does not prevent you from ever changing a program element again. To make changes, create a new open edition of the program element. To revert to an earlier version, replace the edition in the workspace with a different edition from the repository, and create an open edition based on that.

You will probably version your classes frequently, whereas you may leave packages and projects open for extended periods of time.

[ENTERPRISE] In the team development environment, version control is achieved by means of releasing editions into a team baseline. Only program element owners can release. See the list of related topics at the end of this document for links to more information on ownership, baselines, or releasing.

**[ENTERPRISE] Scratch editions**
Scratch editions are editions that no other users of the shared repository can see. Scratch editions appear in VisualAge for Java windows with < > around the edition name:

```
PackageA <1.0>
```

Scratch editions are discussed separately.

**[ENTERPRISE] Undefined editions**
You may see a class or interface whose edition name is “undefined”:

```
ClassA Undefined
```

This means that someone has created a class or interface, but has never versioned or released it. VisualAge for Java has reserved the new program element’s name in the shared repository. Such editions are also marked with the undefined  symbol.

**[ENTERPRISE] Tools for managing your editions**
VisualAge for Java provides two tools for working with editions in a team development environment:

- The Managing page of the Workbench window consolidates information about all the editions that are in the workspace, and is a convenient place to perform activities such as versioning and releasing.
- The Management Query tool helps you search for program elements in the workspace by edition status. Open it by selecting **Management Query** from the **Workspace** menu.

You can also view edition details, such as status and ownership, by selecting **Properties** from a program element’s pop-up menu.

**RELATED CONCEPTS**
Projects and other program elements
Workspace
Repository
Team development - overview
Baselines, releasing, and reloading
Scratch editions
Team development scenarios - introduction
Team development - basic class development pattern
Sample life cycle of an application

**RELATED TASKS**
Creating an open edition
Versioning a program element
Replacing editions in the workspace (reloading)
Releasing a program element
Managing editions of program elements
Building a team baseline

## Scratch editions

Scratch editions are private. Unlike open editions, you can not version them to make them available to other developers on the team. You can create scratch editions of projects or packages. You can not create a scratch edition of a class, but you can create open editions of classes contained in scratch editions of packages.

You *can not release* into a scratch edition of a package or a project.

You might create a scratch edition for any of the following purposes:

- To learn how someone else's code works. After you finish experimenting, delete the scratch edition from your workspace or replace it with another edition from the repository.
- To test a change that you think the owner should make. If you think your change is good, talk to the class owner about integrating it into an edition that can be versioned and released.
- To start development on a class when the containing package has been versioned and the package owner is not available to create an open edition for you. You can make your changes, test and debug them, and version your class edition, but you can not release it until the package owner creates an open edition of the package for you.

If you have configured your VisualAge for Java options to show edition names, your scratch editions will be designated with < > around the program element's version name:

```
PackageA <1.0>
PackageB 1.2
```

In the example above, PackageA is a scratch edition that was created from a versioned edition called 1.0. PackageB is not a scratch edition; it is a versioned edition.

You do not explicitly create scratch editions. VisualAge for Java automatically creates scratch editions from versioned editions, under the following circumstances:

- If you modify a class contained in a versioned edition of a package, and then save your changes. A scratch edition of the package is created in the workspace.
- If you replace the edition of a class in a versioned package with another edition of that class, a scratch edition of the package is created in the workspace.
- If you create a new open edition of a package, in a project that has been versioned, a scratch edition of the project is created in the workspace.

**RELATED CONCEPTS**
Editions and versioning
Baselines, releasing, and reloading
Ownership and team roles - overview
Package groups
**RELATED TASKS**
Creating a scratch edition
Creating an open edition
Versioning a program element
Releasing a program element
Replacing editions in the workspace (reloading)

## Baselines, releasing, and reloading

Every edition of a containing program element has a specific configuration of editions of the program elements that it contains. For example, MyPackage 1.1 may contain MyClass 1.0 and YourClass 1.3, whereas MyPackage 1.2 may contain Myclass 1.1 and YourClass 1.3.

As long as a project or package is an open edition, its configuration of package or class editions can be changed. Program element owners change project or package configurations by *releasing* different package or class editions into them, or by deleting editions. Once a project or package is versioned, that particular configuration of editions is frozen.

In the VisualAge for Java team development environment, these configurations are called project or package *baselines*. Baselines determine which editions a team developer has available to work with, after adding a project or package from the shared repository or after replacing an edition in the workspace with another edition (*reloading*). Baselines allow developers to get a common view of the current state of the application, and to catch inconsistencies early.

A class owner can update a package baseline by releasing a class into the package. A package or project owner can update a project baseline by releasing a package into a project. Classes must be versioned before they can be released. Packages, on the other hand, may be released while they are still open editions. Releasing one or more open packages into a project has the effect of establishing a dynamic, or rolling, baseline for the project. As long as the project contains an open edition of a package, the *project's* configuration of classes is immediately updated every time a class is released into the contained package. The benefit of a rolling baseline is that team members can resynchronize in one step, by reloading the project instead of reloading individual packages or classes.

Since releasing affects every team member who reloads a baseline, changes should be tested before they are released. Classes may be versioned every day, but they should only be released when they are stable.

Periodically, project and package owners will preserve a baseline by versioning the project or package. At that point, all contained packages and classes must also be versioned. The result is a frozen configuration to which the team can return, if necessary.

For more information on baselines, see the team development scenarios that are listed as related topics, below.

**RELATED CONCEPTS**

Team development - overview
Ownership and team roles - overview
Editions and versioning
Team development scenarios - introduction
Team development scenario - single package, multiple developers
Team development scenario - multiple packages, multiple developers
Sample life cycle of an application

**RELATED TASKS**

Building a team baseline
Releasing a program element
Finding unreleased editions in the workspace
Replacing editions in the workspace (reloading)
Managing editions of program elements
Adding projects and packages from the repository to the workspace

# Ownership and team roles - overview

**Ownership**
In the team development environment, change control is based on program element *ownership*. In VisualAge for Java, Enterprise Edition, every project, package, and class has an owner.

The owner of each program element is responsible for its integrity and consistency. For example, while several developers might work concurrently on the same class (in separate open editions), the owner of the class is responsible for merging their changes into a single edition, versioning that edition, and releasing the new version to update the team baseline.

This ownership-based system differs from development environments where change management is based on reserving program elements. In those environments, developers "check out" files to prevent others from concurrently modifying the same component. Often, any developer can check out a program element, change it, and check it back in, thereby affecting the mainstream of development.

By contrast, in the VisualAge for Java team development environment team members can work in parallel on the same program elements (in their own open editions) and their changes are automatically saved in the shared repository, but owners control the mainstream of development; they must approve changes before they are released into the team baseline. This approach offers both programmer productivity and quality control.

**Team roles**
In VisualAge for Java, the following team roles exist:

- Classes have *developers* and *owners*
- Packages, and projects have *owners*
- The repository has an *administrator*
- The repository server is started and stopped by a user called *the EMSRV user*

Each of these team roles is discussed as a separate topic. See the list of related topics, below.

There are certain operations that only these individuals can perform. In actual practice, a team member will probably perform more than one role. For example, the same person might be the developer of several classes, the owner of a few classes, and the owner of one package. Another team member may be the repository administrator and the EMSRV user.

All team members (that is, everyone who has been added to the repository user list by the administrator) are automatically class developers. All team members can browse program elements in the repository, develop classes, and create scratch editions of existing packages to experiment with. To release their work into a team baseline, for other team members to work with, developers must belong to a package group and have the appropriate ownership privileges. See the list of related topics below, for more information.

**RELATED CONCEPTS**
Team development - overview
Class developer

Class owner
Package owner
Project owner
Repository administrator
EMSRV user
Package groups
Repository user list
Team and project organization
Scratch editions
Editions and versioning
Baselines, releasing, and reloading
Team development scenarios - introduction
Sample life cycle of an application

**RELATED TASKS**

Adding users to the repository user list
Adding members to a package group
Changing a program element's owner
Viewing a program element's owner
Viewing a class or interface's developer

## Class developer

Any team member can create new classes and create open editions of existing classes, thereby becoming the *developer* of that open edition of the class.

Only the developer of a particular class edition can version that edition, whereas only the class owner can release the version.

The class developer and the class owner may be the same person, or there may be more than one developer working on the same class. (When multiple developers work on the same class, they work in their own editions.)

**RELATED CONCEPTS**

Team development - overview
Editions and versioning
Baselines, releasing, and reloading
Ownership and team roles - overview
Class owner

**RELATED TASKS**

Creating an open edition
Versioning a program element

## Class owner

A class owner is the team member responsible for the integrity of a particular class and its methods.

Only the owner of a class can update the team baseline in the following ways:

- Release editions of the class into the containing package
- Delete editions of the class from the containing package

Often, the owner and developer of the class are the same person. Sometimes two or more developers may be working on the same class. In that case, the class

owner is responsible for comparing and merging everyone's changes into a single edition of the class. The class owner then versions the merged edition and releases it.

Within an edition of a package, each class has one owner (but may have multiple developers). The same class can have a different owner in another edition of the package.

Any member of the package group can change ownership of the class to any other member of the package group.

**RELATED CONCEPTS**
Team development - overview
Ownership and team roles - overview
Editions and versioning
Baselines, releasing, and reloading
Class developer
Package groups

**RELATED TASKS**
Comparing editions of a program element
Merging editions of a class or interface
Versioning a program element
Releasing a program element
Building a team baseline
Changing a program element's owner

## Package owner

A package owner is responsible for the overall quality of a package. The owner of a package coordinates the activities of the class owners who are releasing their versioned classes into that package.

Only the owner of a package can do these things:

- Version the package to preserve a team baseline
- Create an open edition of the package so that class owners can update the team baseline by releasing or deleting classes
- Add members to the package group and delete members from the group

Both the project owner and the package owner can update the team baseline in the following ways:

- Release the package into its containing project edition
- Delete the package from its containing project edition

Both the administrator and the package owner can transfer ownership of the package to another member of the package group.

If you create a package, you are by default the owner of that package. Different editions of one package may have different owners.

Package owners control when a package is frozen and when it is opened for further development. They should ensure that an open edition of their package is available when class owners need to release their versioned classes or create new classes. Otherwise, the class owners in the package group can only work in their own scratch editions of the package, and they can not release their work.

**RELATED CONCEPTS**
Team development - overview
Ownership and team roles - overview
Editions and versioning
Baselines, releasing, and reloading
Package groups
Scratch editions
**RELATED TASKS**
Versioning a program element
Releasing a program element
Creating an open edition
Adding members to a package group
Changing a program element's owner

## Project owner

A project owner is responsible for the overall quality of a project. A project owner coordinates the activities of the package owners who are releasing their packages into that project.

Only the owner of a project can do the following:

- Version the project to preserve a team baseline
- Create an open edition of the versioned project so that package owners can update the team baseline by releasing their packages
- Add packages to the project and delete packages from the project, thereby updating the team baseline

Both the project owner and the administrator can change ownership of the project. Both the project owner and the package owner can release packages into the package.

It is worth noting that if the project owner does not create an open edition, package owners can no longer release editions and versions of their packages into the project. They can only make changes in a scratch edition of the project. This gives the project owner complete control over when a project is frozen and when it is reopened for further development.

**RELATED CONCEPTS**
Team development - overview
Ownership and team roles - overview
Editions and versioning
Baselines, releasing, and reloading
Scratch editions
**RELATED TASKS**
Creating an open edition
Versioning a program element

## Repository administrator

Each repository has one administrator in its repository user list. The administrator is the only person who can do the following tasks:

- Add, delete, and change users on the repository user list
- Compact the repository

The repository administrator, along with the owners of the affected program elements, can also do these tasks:

- Purge projects and packages from the repository
- Change the owner of a project, package, or class

The repository administrator should know how your VisualAge for Java projects are organized, and which responsibilities have been assigned to each developer on the team.

**Combining repository administrator with other roles**
The person who performs the tasks listed above may also be a developer on the team, but the repository administrator's ID should *not* be used for application development. Change workspace owner to alternate between working as the administrator and working as a developer. This separation of roles provides the following benefits:

- Normal, ownership-based change control mechanisms can not be bypassed accidentally. For example, a developer who is not connected as Administrator can not inadvertently purge another developer's packages.
- The role of the administrator can be transferred to another team member later, without necessitating transfer of owned program elements.
- It is easier for team members to identify the real owner or developer of a program element, by looking at its properties.

The repository administrator may also be the EMSRV user. (The EMSRV user starts and stops the repository server, and backs up the repository with the **emadmin copy** command.) Unlike the EMSRV user, the repository administrator requires access to a workstation running the IDE.

Your repository administrator may also perform the following tasks, although no special VisualAge for Java privileges are required:

- Install the repository server
- Create shared repositories
- Back up shared repositories
- Enable password validation

These responsibilities may be assumed by the same person who is your LAN administrator.

**The repository administrator ID**
When you first install VisualAge for Java, Enterprise Edition, the only user in the repository list is Administrator. This is the default full name for the repository administrator. The first user to connect to the shared repository will connect as the repository administrator. This person should add team members to the repository user list, and then change workspace owner before developing code.

The repository administrator's full name (which appears in user lists like the Change Workspace Owner window) and network login name (which is used to validate the administrator's password validation) can be changed by opening the User Administration window. The repository administrator's unique name cannot be changed.

**RELATED CONCEPTS**
Repository user list

EMSRV user
Ownership and team roles - overview
Workspace owner

**RELATED TASKS**
Adding users to the repository user list
Changing workspace owner
Enabling password validation - overview
Changing a program element's owner
Creating a repository
Backing up a shared repository
Purging program elements from the repository
Compacting a repository
Setting up a team Server - overview

## EMSRV user (All server operating systems except OS/2)

AIX HP-UX Solaris The person who starts the repository server (EMSRV) is known as the EMSRV user. The EMSRV program runs with that user's privileges.

WIN NetWare When you start the repository server (EMSRV), you must provide the name of a user under whose authority the emsrv program will run, as one of the EMSRV startup parameters.

**The EMSRV User's Password**
You must know the EMSRV user's password to perform the following operations:

| Server operating system | EMSRV user's password is required |
|---|---|
| AIX HP-UX Solaris | To stop the server remotely |
| WIN NetWare | To start the server<br>To stop the server remotely |
| OS/2 | Not applicable. Optionally, you can provide a password as a server startup parameter, in which case the same password must be provided to stop the server remotely. This password does *not* have to be the login password of the user who starts the server. |

**Combining the Role of the EMSRV User with Other Roles**
The EMSRV user may also be the administrator. (The administrator maintains the list of users authorized to use the repository, and performs tasks like compacting the repository.) Unlike the administrator, the EMSRV user does not require access to the IDE.

The EMSRV user may be an existing user, or you may want to create a new user for operating the repository server. The EMSRV user requires access to the following files:

- The shared repositories that EMSRV manages on the server
- The EMSRV log file (automatically created and owned by the EMSRV user)
- The passwd.dat file, if you are using it for password validation

**Security considerations**
You may want to restrict access to the above files so that only the EMSRV user has authority over them.

WIN To start the repository server, the EMSRV user must belong to the Administrators group, and must have the Windows NT Advanced User Right "Act as part of the operating system". See the Related Task reference on authorizing the EMSRV user.

WIN The EMSRV user's password can be seen when EMSRV is started from a command prompt or as a manually started service in the NT registry. You can reduce the risk of exposing network passwords by creating a new user just to operate EMSRV and by limiting that user's access to anything other than VisualAge for Java files. If you install EMSRV as a service in the NT registry as an automatically started service, you can hardcode the EMSRV user's name and password and they will not be visible.

**RELATED CONCEPTS**
The repository server (EMSRV)
Repository administrator

**RELATED TASKS**
Starting the repository server on Windows NT
Starting the repository server on OS/2
Starting the repository server on AIX, HP-UX, or Solaris
Starting the repository server on NetWare
Stopping the repository server
Authorizing the EMSRV user (Windows NT)
Enabling password validation - overview

**RELATED REFERENCES**
Repository files
EMSRV startup parameters

## Workspace owner

To be connected to a shared repository, your workspace must have an owner. You choose the owner from the repository user list. The unique name (not the full name) of the workspace owner identifies you to the repository server.

The workspace owner's privileges determine what you can do with program elements in the shared repository. For example, if the workspace owner belongs to a package group, you can create classes in that package. When you create new program elements, the current workspace owner automatically becomes the owner of those elements.

When you save the workspace, for example by exiting the IDE, the workspace owner's name is saved. The next time you start the IDE, the workspace will be connected automatically to the same repository, with the same owner. You can change the workspace owner while you are connected to a shared repository.

The workspace owner's name is always displayed in the title bar of the Workbench window and the Repository Explorer window.

If password validation has been enabled in your environment, you will be prompted for the workspace owner's password when you start the IDE, change repositories, or change workspace owner.

**RELATED CONCEPTS**
Team development - overview

Workspace
Repository
Repository user list
Package groups
Repository administrator
Ownership and team roles - overview

**RELATED TASKS**

Adding users to the repository user list
Changing workspace owner
Enabling password validation - overview
Connecting to a shared repository
Changing repositories

## Repository user list

Each shared repository on the server has a list of VisualAge for Java users who are allowed to use that repository. Team members must be added to the repository user list before they can connect to the repository or be assigned to package groups.

The repository administrator adds team members to the user list. (In addition, if password validation is enabled, the administrator will add the same users to the passwd.dat file or create user accounts in the server operating system.) Usually package owners, not the administrator, add team members to their package groups.

**RELATED CONCEPTS**

Repository
Repository administrator
Ownership and team roles - overview
Package groups
Package owner
Workspace owner

**RELATED TASKS**

Adding users to the repository user list
Enabling password validation - overview
Adding members to a package group
Creating a repository
Connecting to a shared repository

## Package groups

In VisualAge for Java, Enterprise Edition, each edition of a package has a group of developers who are assigned to work with classes in that package. These developers are the *package group* for that edition.

Package group members can do the following things:

- Own classes in the package
- Create classes in the package
- Release classes that they own, into the package
- Delete classes that they own, from the packages
- Change ownership of *any class in the package* (not just the classes that they own)

Different editions of one package can have different package groups.

The package owner adds team members to the package group, after the administrator has added them to the repository user list.

**RELATED CONCEPTS**

Ownership and team roles - overview
Package owner
Class developer
Class owner
Repository user list
Repository administrator

**RELATED TASKS**

Adding members to a package group
Adding users to the repository user list

# Chapter 2. Team development scenarios

## Team Development Scenarios - introduction

To take full advantage of the team programming features of VisualAge for Java, you should establish modes of operation that are suitable for your environment, and adhere to them. To help you design procedures for your own environment, this documentation presents some team development scenarios:

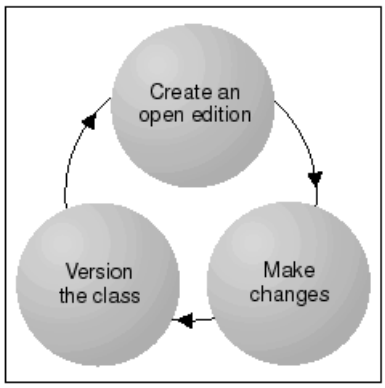
- Basic class development pattern
- Single package, single developer
- Single package, multiple developers
- Multiple packages, multiple developers
- Project wrap-up and delivery

These scenarios build on each other, so it is recommended that you read them in the order shown. They are adapted from the IBM redbook, *VisualAge for Java Enterprise Team Support* (SG24-5245-00). For information on VisualAge for Java books, select the **Library** link at http://www.software.ibm.com/ad/vajava/.

**RELATED CONCEPTS**
Team development - basic class development pattern
Team development scenario - single package, single developer
Team development scenario - single package, multiple developers
Team development scenario - multiple packages, multiple developers
Team development scenario - project wrap-up and delivery
Team development - overview
Sample life cycle of an application

## Team development - basic class development pattern

As a class developer, you move through a cycle of creating an open edition, making changes to it, and versioning it.




Basic development pattern for classes

This basic pattern forms the core of all the work you do in VisualAge for Java. You may enter the cycle at different points, depending on the context in which you are working. You leave the cycle having created a new version of the class.

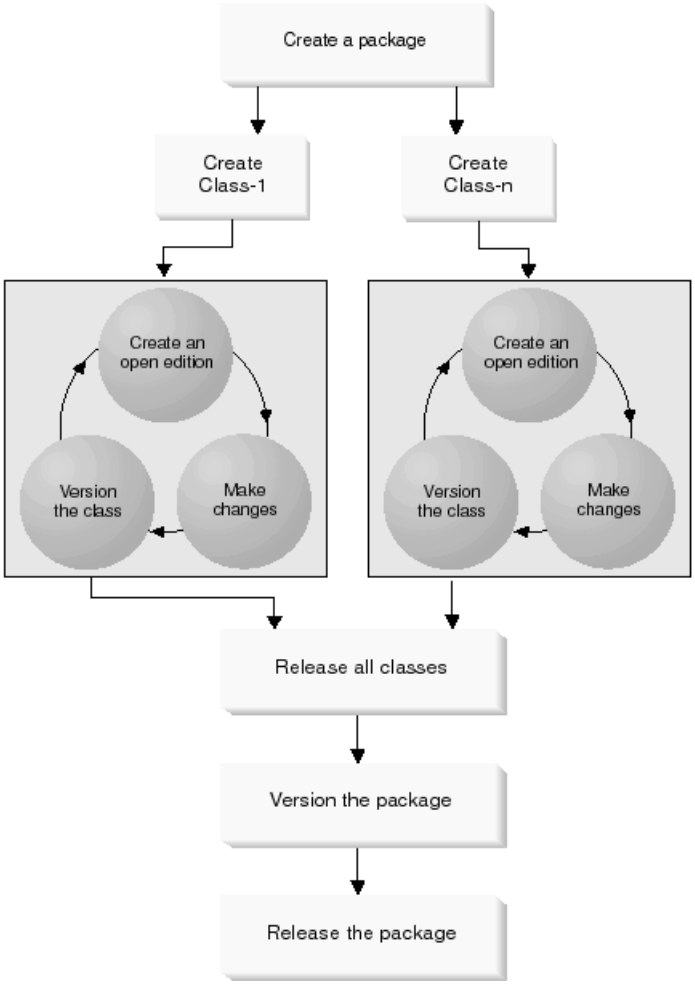
The frequency with which you version your classes depends on personal style and on your team's established practices. One guideline is to version whenever you reach a known state that you may wish to return to. Versioning classes at least once a day would be typical. This pattern naturally supports an incremental development style that is usual in object-oriented programming. When you are working as part of a team, there may also be a requirement to version your classes at defined intervals. Versioning allows your classes to be seen by other developers or to be released by the class owner for the creation of a package baseline.

**RELATED CONCEPTS**
Team development scenarios - introduction
Team development scenario - single package, single developer
Team development scenario - single package, multiple developers
Team development scenario - multiple packages, multiple developers
Team development scenario - project wrap-up and delivery
Team development - overview
Sample life cycle of an application
Editions and versioning
Baselines, releasing, and reloading
**RELATED TASKS**
Creating an open edition
Versioning a program element

## Team development scenario - single package, single developer

This scenario describes the simplest way of working with VisualAge for Java, Enterprise Edition. This is a situation where one person on the team does all of the work for a small application, which consists of a single package. The application may use classes from other packages, but the developer does not need to change them.

The overall process is shown in the following illustration. It builds on the basic class development pattern that is described as a separate topic in this documentation.



Single developer working in a single package

As the developer in this scenario, you play the roles of package owner, class owner, and class developer. A project owner creates a package and transfers ownership of the package to you. You create the classes and interfaces required for the application. You follow the basic class development pattern by creating an open edition, making changes, debugging, and versioning.

When you have finished testing, you release your classes into the package, version the package, and release it. (If you work in an environment that uses rolling baselines, you would have released the package when you created the open edition. Rolling baselines are described in the team development scenario with multiple developers working on multiple packages.)

Although this is a simple scenario, many small applications will be developed this way using VisualAge for Java, Enterprise Edition.

The next team scenario describes an environment where multiple developers work together on a single package.

**RELATED CONCEPTS**
Team development scenarios - introduction
Team development - basic class development pattern
Team development scenario - single package, multiple developers
Team development scenario - multiple packages, multiple developers

Team development scenario - project wrap-up and delivery
Team development - overview
Sample life cycle of an application
Editions and versioning
Ownership and team roles - overview
Baselines, releasing, and reloading

**RELATED TASKS**

Creating an open edition
Creating a package
Creating a class
Versioning a program element
Releasing a program element
Building a team baseline

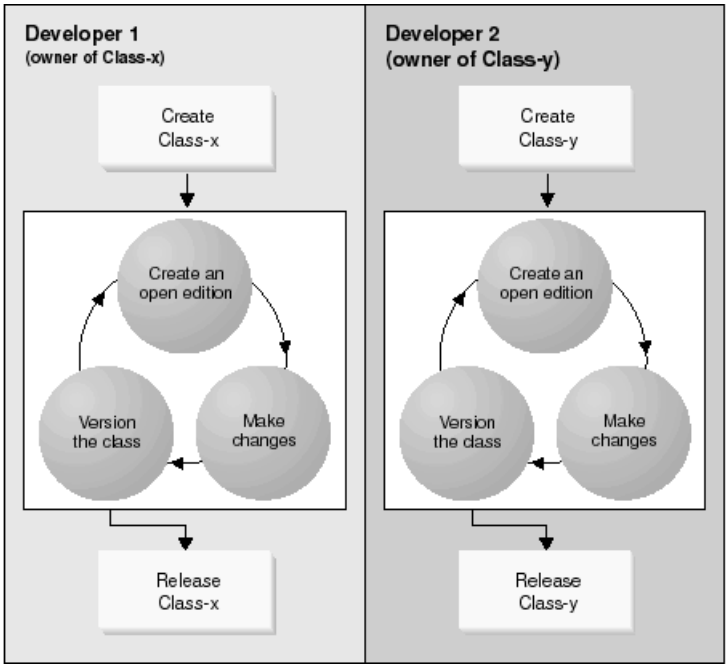
## Team development scenario - single package, multiple developers

In this team development scenario, multiple developers work on an application that consists of a single package. This scenario highlights the cooperative nature of VisualAge for Java team development, and introduces the concept of a package baseline.

**Project set-up**
Typically, in this situation, the lead developer acts as the package owner. The project owner creates the package and assigns ownership to the lead developer.

After some analysis of the problem and after an initial design, the set of classes and interfaces that make up the application are known. The lead developer allocates responsibility to each of the other developers, for a number of classes. As the package owner, the lead developer also adds team members to the package group so that they can create classes and interfaces within the package.

**Basic development pattern**
As with the other team scenarios, the development process in this environment is built on the basic class development pattern. As the following figure illustrates, each developer follows the basic pattern independently.



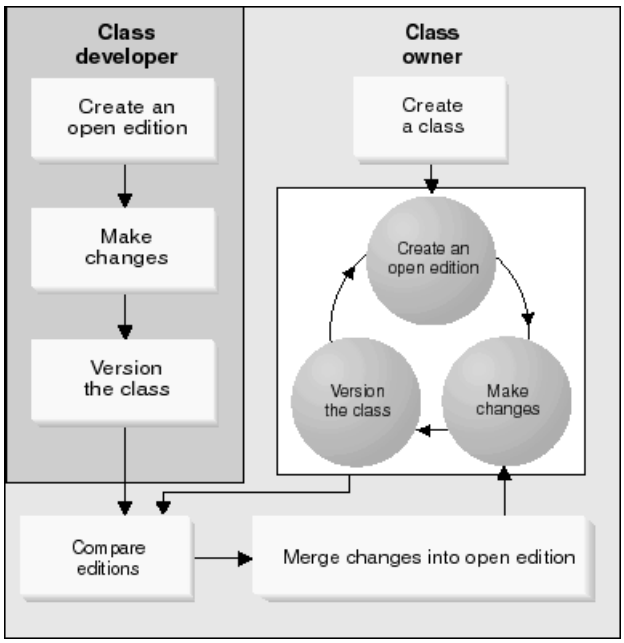
Developers working independently on their own classes

The developer who creates a class or interface automatically becomes its owner. Other developers may make changes to a class they do not own but, as described later, the owner must accept or reject those changes and make them available to the rest of the team. The owner is responsible for the class.

**Merging changes made by different team developers**

In practice, team development is not always as simple as suggested above, since developers are often dependent on each other's work. For example, a developer working on one class may need new function in another class, or may be affected by a bug in another class. And, the owner of that class may be too busy to make the required changes immediately. In the VisualAge for Java team environment, the developer who needs the change can create an open edition of the relevant class, make the changes there, and use that edition to continue working productively.

The person who creates an open edition of a class is the only person who can version that particular edition, but the class owner is the only person who can release the class into the team baseline. As the next step in this scenario, the developer versions the edition to make the changes visible to the class owner, and then consults with the class owner to get approval. The class owner may release the versioned edition immediately, but it is quite likely that the class has been further developed by the owner in the meantime, in which case the owner would merge the two sets of changes in a single open edition. This process is shown in the following illustration.




Class owner reconciles changes made by another team member

Change reconciliation is easy to do with the comparison browser in VisualAge for Java; the owner views class and method definitions side-by-side, and selectively loads from other developer's version into the open edition in the workspace. Reconciliation of class changes should occur on a regular basis. Fewer errors occur when reconciliations are small and frequent.

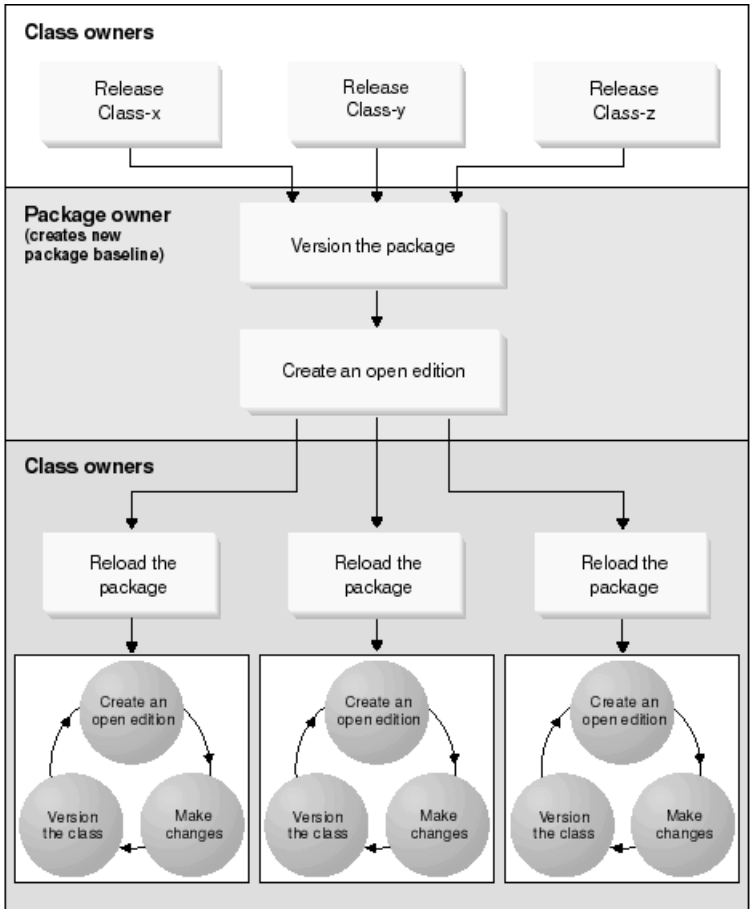
Once the changes have been merged, the normal development pattern resumes.

**Establishing a package baseline**

The project manager has established a plan that identifies milestones in the application development process. Milestones generally represent the achievement of a certain level of functionality within the application. They also provide an opportunity for all developers to synchronize with each other and get a common view of the current state of the application. This process is called establishing a *baseline*. Baselines help the team to find inconsistencies early in the development process, before they become entrenched.

When a deadline is approaching, the lead developer expects programmers to have all their classes in a working state, and instructs the class owners to release. The lead developer, who is the package owner, establishes a new baseline by versioning the package. The lead developer then opens a new edition of the package, so the team can resume work on it. Before continuing with their development work, the team developers synchronize with the new baseline by reloading the package. To reload, they select **Replace with** > **Another Edition**from the package's pop-up menu in the Workbench, and choose the new open edition.

The following figure illustrates the process of establishing a baseline for a package.



Establishing a package baseline

At this point, the class owners resume the normal development pattern until the next project milestone and the production of a new baseline.

The next team scenario describes a more complex environment, where multiple developers work on multiple packages.

**RELATED CONCEPTS**
Team development scenarios - introduction
Team development - basic class development pattern
Team development scenario - single package, single developer
Team development scenario - multiple packages, multiple developers
Team development scenario - project wrap-up and delivery
Team development - overview
Sample life cycle of an application
Editions and versioning
Ownership and team roles - overview
Baselines, releasing, and reloading

**RELATED TASKS**
Creating an open edition
Creating a package
Creating a class
Versioning a program element
Releasing a program element
Building a team baseline
Comparing editions of a program element

Merging editions of a class or interface
Replacing editions in the workspace (reloading)

## Team development scenario - multiple packages, multiple developers

This scenario is typical of team development on a large-scale project. In this environment, a number of people work together on an application that includes multiple packages. This scenario extends the other team development scenarios included in this documentation.

**Set-up and basic development pattern**
A large development project includes many distinct subsystems, partitioned into separate packages. The project team is divided into smaller teams; each team is responsible for a particular package. The project owner, who is perhaps the chief architect, creates the packages and assigns ownership of each package to the corresponding team leader. Each team leader adds the team members to the package group.

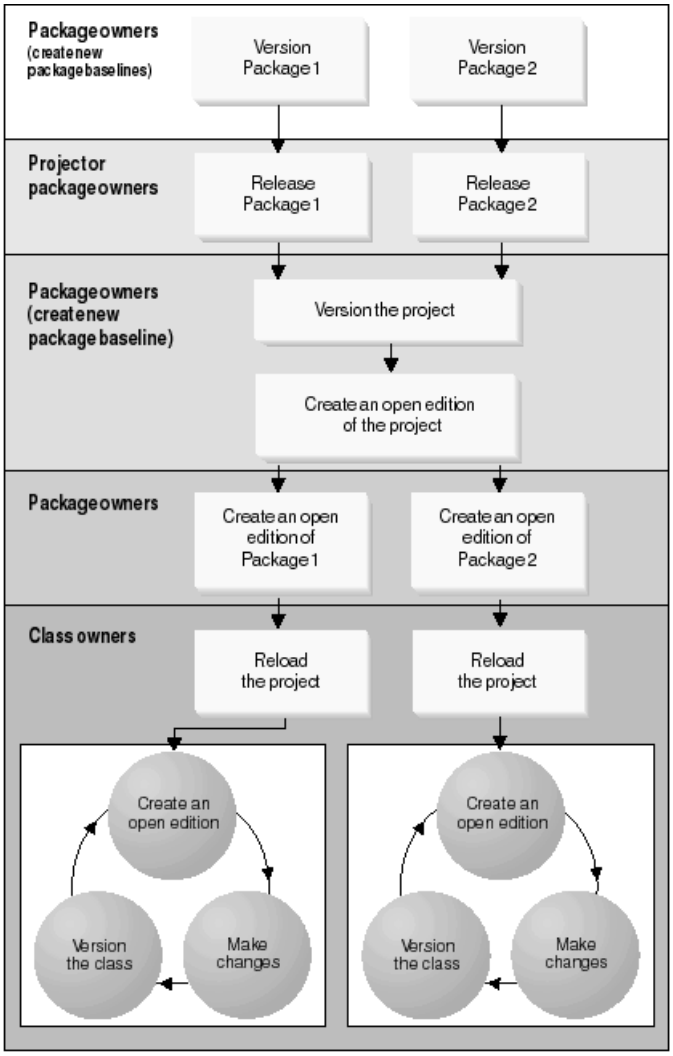
As in the previous team development scenarios, developers in this environment follow the basic class development pattern: they create open editions, make changes, and version their open editions. As in the scenario with multiple developers working on a single package, package baselines are established on a regular basis, and class owners reconcile other developers' changes to their classes. Change reconciliation sometimes occurs across package boundaries, when a developer working in one package has to change a class that is in another package. The process for merging changes across packages is exactly the same as it is within a single package.

**Standard project baseline**
There are two approaches to establishing a project baseline for the team. One is the standard project baseline, which is static; the other is the rolling baseline, which is dynamic.

The standard project baseline is analogous to the package baseline that was described in the scenario with multiple developers working on a single package. To establish a standard project baseline, you start by creating a baseline for each package in the project. Next, the versioned packages are released into the project, either by the individual package owners or by the project owner. Once all the packages are versioned and released, the project owner creates a new baseline by versioning the project.

The new version represents an immutable state of the project, its packages and all their classes. This frozen state distinguishes the standard baseline from the rolling baseline that is described below. With a standard project baseline, if work is to continue, the project owner must create an open edition of the project so the package owners can create open editions of their packages and the class developers can recommence releasing changes into the packages.

The following figure illustrates the process of establishing and loading a standard project baseline.



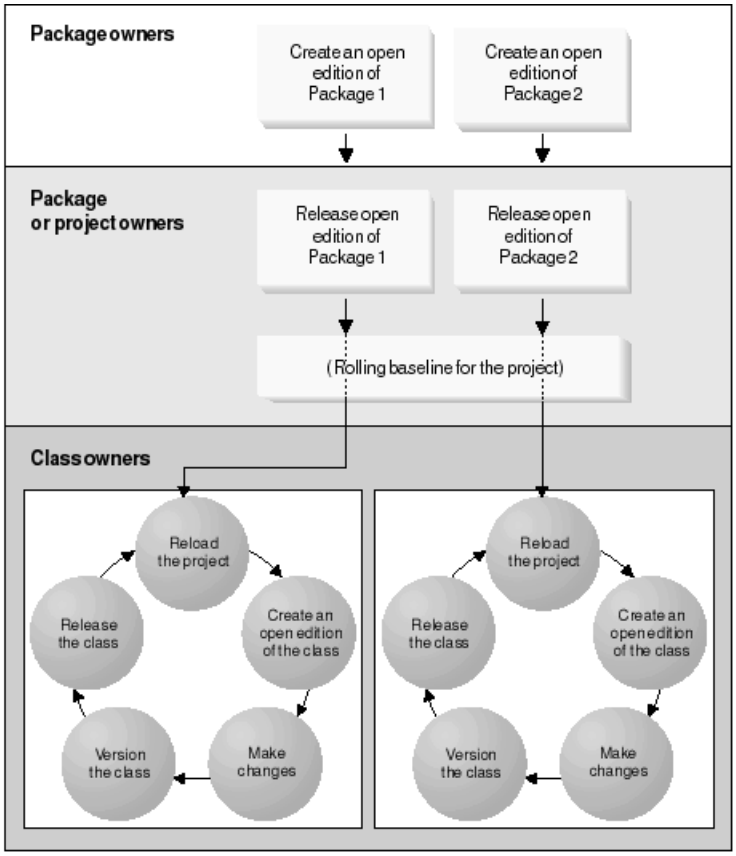

Establishing a standard project baseline

**Rolling project baseline**

You are most likely to create a standard project baseline at major project milestones and at the end of a project. For ongoing development, it can be quite a burdensome process. It is often difficult for the team to produce a baseline for all packages at the same time. VisualAge for Java provides a more flexible way for the team to synchronize with the current state of the application. The alternative is to establish a rolling project baseline.

The main difference in this approach is that packages are released into the project while they are still *open editions*. Unlike classes, packages do not have to be versioned before they can be released. As a result, the project baseline is dynamic: when a class is released into a package, the configuration of the containing project is simultaneously updated. Any time a developer reloads the project (by selecting **Replace with** > **Released Contents** from the project's pop-up menu in the Workbench), the class editions that are in the workspace are all replaced with the editions that the class owners have most recently released.

The following figure illustrates the process of establishing and loading a rolling project baseline.



Establishing a rolling project baseline

### Combining baseline approaches

Caution should be exercised with the rolling baseline technique. Releasing a class straight into the project has the effect of bypassing any integration testing that, in a standard baseline environment, would occur at the package level. The release of a defective class could seriously affect the productivity of any programmer who loads it. For that reason, you might want to restrict the rolling baseline technique to packages where the class owners are senior programmers who always test their classes prior to release.

**RELATED CONCEPTS**

Team development scenarios - introduction
Team development - basic class development pattern
Team development scenario - single package, single developer
Team development scenario - single package, multiple developers
Team development scenario - project wrap-up and delivery
Team development - overview
Sample life cycle of an application
Editions and versioning
Ownership and team roles - overview
Baselines, releasing, and reloading

**RELATED TASKS**

Creating an open edition
Creating a package
Creating a class
Versioning a program element
Releasing a program element
Building a team baseline

Comparing editions of a program element
Merging editions of a class or interface
Replacing editions in the workspace (reloading)

## Team development scenario - project wrap-up and delivery

Like the basic class development pattern that is presented as a separate topic, the process for delivering a project is common to both small and large team development environments.

The first step is to produce a standard project baseline, as described in the team development scenario with multiple developers working on multiple packages. You may wish to create a separate project for the released version, to reinforce the separation of development and production versions of the project. Or, you may use the existing project as the reference version. In either case, *add comments* to the open edition of the project before you version it. It is useful to establish a standard format for comments, and to use it extensively.

When you have a completed, versioned project, choose a delivery mechanism. VisualAge for Java, Enterprise Edition, offers a number of options for exporting your work so that it can be delivered to your customer:

- Export .class or .java files to the file system
- Publish an applet
- Produce a .jar file
- Export to another repository

These tasks are discussed as related topics.

**RELATED CONCEPTS**
Team development scenarios - introduction
Team development - basic class development pattern
Team development scenario - single package, single developer
Team development scenario - single package, multiple developers
Team development scenario - multiple packages, multiple developers
Team development - overview
Sample life cycle of an application
Editions and versioning
Baselines, releasing, and reloading

**RELATED TASKS**
Building a team baseline
Exporting and publishing code
Deploying an applet on the network station
Deploying an application on the network station
Exporting to another repository

**RELATED TASKS**
Creating a project
Versioning a program element

## Sample life cycle of an application

The following example shows the steps that a team of developers might follow to deliver enhancements to an existing VisualAge for Java application. In the example, there are five team members:

- The repository administrator

- A project owner
- A package owner
- Two class owners

In your own environment, one person may perform two or more of these roles, or your team may be much larger than five people. The basic flow is the same, regardless of whether you have a “team of one” or a team of twenty or more developers.

Similarly, the example shows the creation of one project, one package, and two classes. In your own projects you may be working with existing program elements, and you may have many more of them.

**Phase 1: Project initiation**
The steps in this phase would only be performed once, at the beginning of the project.

| Team member | Steps performed |
|---|---|
| Administrator | • Adds all members of all project teams to the repository user list. |
| Project Owner | • Creates a new project, using the Comments pane of the SmartGuide to document the purpose. By default, the edition status is open.<br>• Adds any necessary packages from the shared repository to the open edition of the project in the workspace, and then releases them to update the project baseline.<br>• Creates one or more new packages, including PackageA, in the open project. New packages are released automatically.<br>• Adds Package Owner, Class Owner A, and Class Owner B to the package group for PackageA.<br>• Transfers ownership of PackageA to Package Owner. |
| Administrator | • Reviews ownership of existing packages. If classes in those packages require changing, transfers package ownership to someone on the team. (The new package owner would add developers to the package group and assign ownership of classes.) |
| Package Owner, Class Owner A, Class Owner B | • Connect to the shared repository and add the open edition of the project to workspace. This action will automatically add the released package and class editions contained in the project. |

At this point, every team member’s workspace contains the open edition of the new project, any existing packages (and any contained classes) that the project owner added to the project, and an open edition of PackageA. The team is ready to begin development.

**Phase 2a: Ongoing development**
In this phase, the team develops the planned enhancements to their application. As is always the case with VisualAge for Java, the development process is iterative.

| Team Member | Steps Performed |
|---|---|
| Class Owner A | • Creates one or more new classes in PackageA, including ClassA.<br>• Versions open class editions after completing significant blocks of work. |
| Class Owner B | • Creates one or more new classes in ProjectA, including ClassB.<br>• Versions open class editions after completing significant blocks of work. |
| All Team Members | • As necessary, add other team members' versioned classes to their workspaces, for testing.<br>• As necessary, make changes to classes. (Each team member works in a different open edition of each class.)<br>• Version open class editions after completing significant blocks of work. |
| Class Owner A | • On request, compares other developers' changes to ClassA and merges them into a single versioned edition.<br>• Releases the latest stable version of ClassA into the open edition of PackageA in the repository, to update the team baseline.<br>• Tells the team when to replace the edition of ClassA that is in their workspaces, with the latest released contents. |
| Class Owner B | • Performs the same activities as Class Owner A, for the classes he owns (including ClassB). |
| All Team Members | • When advised by class owners, replace the class editions in their workspaces with more recently versioned editions from the shared repository by selecting **Replace with Released Edition** from the pop-up menu for the *class*.<br>• When they want to reload *all* the classes within a package or project, select **Replace with Released Contents** for the *package* or *project*. If this backs out changes that they want to keep, they can retrieve their open editions by selecting **Replace with Another Edition** for those specific program elements. |
| Administrator | • Every night, backs up the shared repository. |

You may have noticed that, in this example, the package and project editions remain open while the classes are frequently versioned. That is a typical development pattern. If you prefer to version projects or packages while classes are

still being developed, then it is important that project and package owners create new open editions immediately after versioning, so that class developers can continue to release their changes into the team baseline. For more information on development patterns and team baselines, see the team development scenarios that are included elsewhere in this documentation.

**Phase 2b: A deviation from the main development flow**
This minor variation illustrates how members of the VisualAge for Java package group are really “trusted peers”.

| Team member | Steps performed |
|---|---|
| Package Owner | • Makes some useful changes in an open edition of ClassB. |
| Class Owner B | • Likes the changes, but is too busy to incorporate them. Suggests that Package Owner incorporate the changes herself. |
| Package Owner<br>(new owner of ClassB) | • Transfers ownership of ClassB to herself. (Any member of the package group can do this.)<br>• Compares her changes with the latest released version of ClassB, in case there are new changes to be merged.<br>• Versions her open edition of the class, and releases it. |
| Class Owner B<br>(original owner of ClassB) | • Loads Package Owner’s released version of ClassB into the workspace (**Replace with Released Edition**).<br>• Changes ownership of ClassB back to himself. |

This example shows how flexible the team development environment is, and why communication and cooperation among team members is very important.

**Phase 3: Preparation for testing**
At this point, the team is ready to close off work, for acceptance testing.

| Team member | Steps performed |
|---|---|
| Class Owners | • Search for their unversioned editions (using **Management Query** from the Workspace menu), so they can version and release them.<br>• Search for remaining unreleased versions and release them. |
| Package Owner | • Searches to make sure there are no unversioned or unreleased class editions.<br>• Versions PackageA. |

At this point, someone on the team would bundle the VisualAge for Java program elements with the necessary resource files (for example, images or audio clips) and deliver the application to the testers. The steps required to do this, which might include exporting to the file system or publishing to an intranet, are not dependent on any particular VisualAge for Java privileges or team roles.

The package will remain frozen until testing has been completed. Meanwhile, team members who want to experiment with changes to classes in the package can do so by creating their own scratch editions of the package.

**Phase 4: Wrap-up**
Assuming that acceptance testing goes well and the users only report a few small problems, the team would follow a process similar to the following one in order to wind down the project.

| Team member | Steps performed |
|---|---|
| Package Owner | • Creates a new open edition of PackageA so class owners can make changes.<br>• Releases the open edition of the package, so the project baseline will be updated automatically as classes are released. |
| Class Owners | • Reload the project (**Replace with Another Edition**).<br>• Make final changes to their classes.<br>• Version and release their changed classes into the open edition of PackageA. |
| Package Owner | • Updates the comments for Package A.<br>• Versions PackageA (which was released when it was created). |
| Project Owner | • Updates the comments for the project.<br>• Versions the project. |

Again, someone on the team would take the necessary steps, such as exporting, to actually deploy the application. Deploying is not dependent on any VisualAge for Java privileges or team roles.

**RELATED CONCEPTS**
Team development - overview
Ownership and team roles - overview
Editions and versioning
Baselines, releasing, and reloading
Team and project organization
Team development scenarios - introduction
Team development scenario - single package, multiple developers
Team development scenario - multiple packages, multiple developers
Team development scenario - project wrap-up and delivery

**RELATED TASKS**
Creating an open edition
Creating a scratch edition
Comparing editions of a program element
Merging editions of a class or interface
Versioning a program element
Releasing a program element
Building a team baseline
Replacing editions in the workspace (reloading)
Managing editions of program elements
Finding unversioned editions in the workspace
Finding unreleased editions in the workspace
Sharing resource files

# Chapter 3. Working in a team environment

## Migrating to the team development environment

This document describes how to migrate from VisualAge for Java, Version 1.0 (where each developer has a separate repository) to the team development environment of VisualAge for Java, Version 3.0 (where multiple programmers share a single repository).

This approach includes the following phases, each of which is described in more detail below:

- Preparing clients for migration
- Preparing the team server
- Testing a client connection
- Adding users to the repository user list
- Migrating the VisualAge for Java team clients
- Learning about team development
- Assigning team roles

**Preparing the clients for migration**
*Before you install* the VisualAge for Java, Version 3.0 client code on any workstation where Version 1.0 is installed, do these three things:

1. Version all projects and packages that you wish to migrate. *You must do this.* Only versioned projects and packages can be migrated.
2. Back up any resource files (for example, images or sound files) used by your Java applications, to a directory *outside* the directory tree where VisualAge for Java, Version 1.0, is installed. By default, resource files for each VisualAge for Java project are located in subdirectories called *x:**IBMVJava*\ide\project_resources\`project`, where *x:**IBMVJava* is the VisualAge for Java, Version 1.0 installation directory and `project` is the name of a particular project.
3. As a precaution, back up the existing repository file. The file name is *x:**IBMVJava*\ide\repository\ivj.dat, where *x:**IBMVJava* is the directory where you have installed VisualAge for Java, Version 1.0. Save a copy of this file in a location that is *outside* your VisualAge for Java directory tree. To conserve disk space, you may choose to back up to an offline medium, such as tape.

Explanation: The VisualAge for Java, Version 3.0 installation program follows this process:

- Renames the existing ivj.dat file to ivj10.dat
- Temporarily moves ivj10.dat to a directory called x:_$migrate\ide\repository
- Attempts to identify resource files, and temporarily moves them to x:_$migrate\ide\project_resources
- Uninstalls all VisualAge for Java, Version 1.0 files from the IBMVJava directory tree
- Installs VisualAge for Java, Version 3.0

- Moves the ivj10.dat repository file and the resource files from x:_$migrate to the new program directory, so that you can import *versioned* projects and packages from that repository

Because the Version 1.0 repository is not compatible with the Version 3.0 workspace, *you will not be able to connect to your old repository* from the IDE in VisualAge for Java, Version 3.0. You will only be able to import versioned program projects from the old repository into Version 3.0 repositories.

**Preparing the team server**
Before team developers can migrate to the shared repository, the administrator must set up the VisualAge for Java server and start the EMSRV repository server program. (If some developers wish to start using VisualAge for Java, Version 3.0 before the server is ready, they can first install as standalone users and then connect to the shared repository later. See below for instructions on installing a client with a local repository.)

A shared repository, called ivj.dat, copied from the product CD to the server along with the emsrv program and other server files. When starting the repository server program, the administrator should take care to provide the correct path information for ivj.dat as the EMSRV working directory.

See the related topics listed at the end of this document for links to information on setting up a team server, starting EMSRV, and EMSRV startup parameters.

**Testing a client connection**
To confirm that the server has been successfully started, the administrator should connect to the shared repository from a VisualAge for Java, Enterprise Edition, Version 3.0 client. This action will confirm that the server's TCP/IP connection is working properly, that EMSRV has been started with the correct parameters, and that the administrator knows what server information must be provided during client installation.

See the related tasks listed at the end of this document for a link to more information on connecting to a shared repository.

**Adding users to the repository user list**
When a client first connects to the shared repository, the user is prompted to provide a workspace owner name. (You might think of the workspace owner name as a VisualAge for Java "user ID".) The user cannot start the IDE without first selecting a valid workspace owner name from a list of repository users.

By default, VisualAge for Java, Version 3.0 has a user called Administrator in its repository user list. Each user could initially choose Administrator as the workspace owner name; however, it is strongly recommended that every user provides a unique name to connect to the server, right away. In the VisualAge for Java team development environment, change control is based on defined user roles, which means each developer should be uniquely identified. To meet this objective, the administrator must add everyone to the list of repository users. (The only VisualAge for Java user who can add other names to a repository user list is Administrator.)

See the related tasks listed at the end of this document for a link to information on adding users to the repository list.

**Installing the VisualAge for Java team clients**

Now that the administrator has set up the server and added the team developers to the repository user list, each member of the development team follows these steps:

1. In VisualAge for Java, Version 1.0, use the Repository Explorer to review your program elements and confirm that you have versioned all projects that you wish to keep. As explained above, this step is *critical*.
2. Back up your resource files, as explained above.
3. Close VisualAge for Java, Version 1.0 by exiting the IDE.
4. Before you start to install VisualAge for Java, Version 3.0, ask your administrator for the following information:
   - The host name or IP address of the server. You will need to specify this information during installation.
   - The file name of the shared repository. You will need to specify this during installation. The file name is probably ivj.dat; you will not need to specify path information if the administrator specifies the repository's location as the EMSRV working directory when starting the server.
   - The repository user name to use as workspace owner. You will need to select this name when you start VisualAge for Java, Version 3.0.
   - If password protection is enabled, the password for that workspace owner. (By default, VisualAge for Java password protection is not enabled.)
5. Start the VisualAge for Java, Version 3.0 installation. For details on installation, refer to the readme.txt file on the product CD and to the installation program flow that was outlined above. The installation program will rename your Version 1.0 repository to ivj10.dat and move it along with any resource files that it can identify, to a temporary directory on your workstation, as described above.
6. When prompted by the installation program, specify that you wish to use a repository that resides on a **server**. (If, instead of always working as client connected to a shared repository, you would like to have a local repository on your workstation for working in standalone mode, see the alternative instructions below.)

   Provide the server's **TCP/IP host name** (or IP address) and the **repository name**, as given to you by your administrator. The server's repository name is usually ivj.dat, but you may have other .dat files in your VisualAge for Java team environment. If the administrator did not specify a working directory when starting the EMSRV program, then you will need to fully qualify the repository's name with the *server's* path information for that file. The installation program will automatically insert the server address and repository information into the client's ide.ini file.

   When VisualAge for Java, Version 3.0 is installed, the backed up repository and resource files should be moved from _$migrate\ide to the new IBMVJava directory tree. You will be prompted to restart your system.
7. After rebooting, start the VisualAge for Java IDE. Provided that the server has been successfully started and that you supplied correct server and repository information during installation, you will be asked to select a workspace owner name from the list of repository users that the administrator has set up.

   Select the user name that your administrator has told you to use. If password protection has been enabled, you will need to provide that user's password. A progress bar indicates that the workspace is being connected to the repository.

If, instead of a user list, you see an error message indicating that an unrecoverable error has occurred, see below for a link to information on connecting to a shared repository. That topic explains some possible causes for connection failure.

8. Another progress bar indicates that VisualAge for Java installation is being completed. Depending on which optional features of VisualAge for Java you chose to install, this can take a while.
9. Eventually, the Import from Another Repository SmartGuide will open with the correct options set for importing your versioned projects from the old repository, ivj10.dat. Follow the instructions in the SmartGuide to import your projects from VisualAge for Java, Version 1.0.

   If you do not wish to migrate your Version 1.0 program elements immediately, you can close the Import SmartGuide and proceed with using VisualAge for Java, Version 3.0. You can import selected projects and packages from your old repository as long as you keep the ivj10.dat file on your workstation. However, the Import SmartGuide will only open automatically the first time that you start the IDE after installing Version 3.0. For a link to information on importing from another repository, see the list of related tasks below.
10. You are now connected to the shared repository on the team server. The title bar of all VisualAge for Java windows displays the workspace owner name that you selected. If you select **Admin** > **Properties** from the Repository Explorer window's menu bar, the Properties dialog box displays the name of the server and the name of the shared repository in *servername*::*filename* format. When you exit the IDE, this information will be saved.
11. Copy your applications' resource files, such as images or sound files, into the appropriate subdirectories. If desired, your development team can keep all resource files in a single shared directory. For information on sharing resource files, see the list of related tasks at the end of this document.

Next, you should learn about the team development environment and assign team roles, as described below.

**Installing a client that has a standalone Version 3.0 repository**

You may wish to have your own VisualAge for Java, Version 3.0 repository on your workstation, to use when you are not connected to the shared repository. In this case, when you are installing VisualAge for Java, Version 3.0 on your workstation (after versioning your existing projects and backing up your resource files, as instructed above), specify that your repository will be on your local machine, rather than on the server. The installation program will rename your old repository to ivj10.dat; create a Version 3.0-compliant repository called ivj.dat on your workstation; uninstall VisualAge for Java, Version 1.0; and update your ide.ini file to point to the new (local) repository.

The first time that you start the IDE, your workspace will be connected to the new ivj.dat repository on your *local* system, and the Import SmartGuide will open so that you can migrate your versioned projects from your Version 1.0 repository (ivj10.dat) to the Version 3.0 repository on your workstation (ivj.dat). You can import to your local repository now or later, or you can import to the shared repository when you connect to it later. As long as you keep the old ivj10.dat file on your workstation, you can import versioned projects and packages from it to any Version 3.0 repository.

When you want to use the shared repository on the team server, follow these steps:

1. From the Repository Explorer window, select **Admin** > **Change Repository** from the menu bar. Select **Use a shared repository with EMSRV server address**; specify the name of the server and the name of the repository. See the related tasks listed below, for information on changing repositories.
2. If password protection has not been enabled on the server, you might be automatically connected to the repository as Administrator. Look at the workspace owner name in the title bar of the Workbench window. If Administrator's name appears in the title bar, select **Workspace**> **Change Workspace Owner** from the menu bar. From the list of repository users that appears, select the user name that the administrator has set up for you.
3. Once you have connected to the shared repository, import the projects that you want to use from the local repositories on your workstation. (On your workstation, you will have a Version 1.0 repository called ivj10.dat and a Version 3.0 repository called ivj.dat.) For information on importing from a local repository to a shared repository, see the list of links below.

When you exit the IDE, information about the workspace owner and the repository connection will be saved. You can change workspace owner or change repository whenever you need to, as described above.

**Learning about team development**
Before doing new development, familiarize yourself with the team development environment. You can learn about team roles and related concepts by doing the exercises in *Getting Started, Enterprise Edition.* This book is included with the VisualAge for Java product. You can also use the online help to review the Getting Started topics in your Web browser, or to print the book as an Acrobat PDF file.

**Assigning team roles**
Change control in the team development environment is based on ownership. Team roles should be properly assigned *before* new development begins. The team needs to decide who should own which projects, packages, and classes in the shared repository.

As soon as program elements are imported into the shared repository on the server, everyone on the team can browse them in the Repository Explorer window and add them to their workspaces. However, program elements that are imported from VisualAge for Java, Version 1.0 are by default owned by Administrator; therefore, by default only Administrator can create open editions of versioned projects and packages, and only Administrator can release new versions of classes. For any projects and packages that will undergo new development, Administrator should transfer ownership to the correct team members. Then, each package owner should create a package group, transfer ownership of imported classes to developers in the package group, and delete Administrator from the package group so that Administrator can no longer create or own classes in the package.

Once program elements have been assigned to the correct owners, team members can start to perform their new roles.

For more information on team development concepts, see the list of links below.

**RELATED CONCEPTS**
Team development - overview
Team client/server configuration
Repository administrator
Repository user list
Workspace owner

Team and project organization

**RELATED TASKS**

Setting up a team server - overview
Starting the repository server on Windows NT
Starting the repository server on OS/2
Starting the repository server on AIX, HP, or Solaris
Starting the repository server on NetWare
Connecting to a shared repository
Adding users to the repository user list
Enabling password validation
Importing from another repository
Changing repositories
Providing a standard workspace
Sharing resource files

**RELATED REFERENCES**

EMSRV startup parameters

## Logging in to the server

If the VisualAge for Java repository server (EMSRV) has been started with password validation enabled, you will be prompted for a password when you perform either of these tasks:

- Connect to a shared repository on the server
- Change workspace owner

Otherwise, there is no "login" required. While you are using VisualAge for Java, you have the privileges of the current workspace owner. To work as someone else, select **Change Workspace Owner** from the **Workspace** menu.

**RELATED CONCEPTS**

Team client/server configuration
The repository server (EMSRV)
Workspace owner
Repository user list

**RELATED TASKS**

Connecting to a shared repository
Changing workspace owner
Enabling password validation - overview
Adding users to the repository user list

**RELATED REFERENCES**

EMSRV startup parameters

## Connecting to a shared repository

Your workspace is automatically connected to a shared repository when you perform *one* of these tasks:

- Start the IDE in the team development environment. The workspace will connect to the same server and shared repository that you were using when you last exited the IDE.
- Change to another shared repository, after starting the IDE.

The first time that you connect to a shared repository, you will be asked to select a workspace owner from the repository user list. Contact the repository administrator if your name is not on the list. If password validation has been enabled on the repository server, you will need to provide your password to connect to any repository on that server.

Whenever you connect to to a repository, VisualAge for Java performs a complete check for consistency with the workspace. This can take some time. Inconsistencies are noted in the Log window.

Once you have connected to a shared repository, you can browse it using the Repository Explorer window. Ask your project leader which editions you should add from the repository to your workspace, so you can start programming.

**The ide.ini file**

The names of the server and the repository are stored in the [JavaDevelopment] section of the ide.ini file on your client workstation. This information is provided when you install VisualAge for Java on the client, and it is saved when you exit the IDE. Here is an example:

```
[JavaDevelopment]
ServerAddress = bestteam
DefaultName = team1.dat
```

In the above example, “bestteam” is the IP host name of the server and team1.dat is the name of the shared repository. Because no path information is provided for the repository, the repository server the EMSRV working directory. See the list of related topics, below, for more information about the EMSRV working directory.

Here is another example:

```
[JavaDevelopment]
ServerAddress = 9.55.55.155
DefaultName = j:\javateam\ivj.dat
```

In the second example, the server’s IP address is used instead of its host name, and explicit path information is provided for the shared repository. In this example, j: is a local drive on the *server*.

**Handling connection errors**

If you have trouble connecting to a shared repository, check the following things:

- Are the server and repository names spelled correctly in the ide.ini file?
- Has EMSRV been started on the server? Use the **emadmin stat** *hostname* command to verify.
- Did the administrator supply the right EMSRV startup parameter for working directory? To see the current EMSRV working directory, issue the **emadmin opts** command.
- Has TCP/IP been started on the server and the client? To verify, ping the server from the client, using the appropriate command for your TCP/IP software.
- Has some process other than EMSRV locked the repository file?

**RELATED CONCEPTS**

Team development - overview
Team client/server configuration
The repository server (EMSRV)
Repository administrator
Repository user list

**RELATED TASKS**
Changing repositories
Adding users to the repository user list
Enabling password validation - overview
Changing workspace owner
Adding projects and packages from the repository to the workspace
Adding classes and methods from the repository to the workspace
Reconnecting after a server failure
Working at a standalone workstation
Changing the EMSRV working directory

**RELATED REFERENCES**
EMSRV startup parameters
The EMADMIN utility - overview
The EMADMIN stat command
Repository files

## Changing workspace owner

The workspace owner's unique name, from the repository user list, is what identifies you to the repository server. At times, you might want to work as someone else. For example, you may want to work as the repository administrator so you can add users. You can do this by changing the current workspace owner.

To change workspace owner:

1. From the **Workspace** menu, select **Change Workspace Owner**. A dialog box will appear, listing all the names from the repository user list.
2. Select the new workspace owner, and click **OK**.
3. If password validation is enabled on your server, you will be prompted for the network password of the new workspace owner. Type the password and click **OK**.

You can also change the workspace owner by double-clicking on the current owner's name in the status bar at the bottom of the window.

On all VisualAge for Java windows, the title bar will show the new workspace owner's name.

**RELATED CONCEPTS**
Workspace owner
Repository user list

**RELATED TASKS**
Enabling password validation - overview
Adding users to the repository user list

## Creating an open edition

To make changes to a program element, you must first create an open edition of it. Versioned editions can not be changed.

To create an open edition of a project, package, class, or interface that has been versioned, select **Manage** > **Create Open Edition** from the program element's pop-up menu.

In many cases, you can also create an open edition implicitly by opening a versioned edition in a browser, making changes, and then saving your changes.

An open edition appears in VisualAge for Java windows with a timestamp that shows when it was created. If you can not see the timestamp, click the Show Edition Names  button. Here is an example of an open edition:

```
PackageA (3/28/98 4:21:15 PM)
```

The following table summarizes considerations for creating open editions.

| Program element | Considerations |
|---|---|
| Project or Package | • In VisualAge for Java, Professional Edition, an open edition is created automatically when you change any contained program element.<br>• **[ENTERPRISE]** Only the owner can create an open edition of a project or package that has been versioned.<br>• **[ENTERPRISE]** If you create an open edition of a package and the containing project is not already an open edition, then a scratch edition of the project will be created. |
| Class or Interface | • An open edition is automatically created if you open the class, interface, or a contained method in a browser, and save changes to it.<br>• **[ENTERPRISE]** If you create an open edition of a class and the containing package is not already an open edition, then a scratch edition of the package will be created. |
| Method | • A new open edition is created every time you save changes to the method. |

**RELATED CONCEPTS**
Editions and versioning
Scratch editions
Ownership and team roles - overview
**RELATED TASKS**
Versioning a program element
Releasing a program element
Creating a scratch edition
Managing editions of program elements
Replacing editions in the workspace (reloading)

## Versioning a program element

Periodically, you will version your open editions of program elements to save copies of them at meaningful stages in their development. You will probably version your classes quite frequently; whereas you may leave packages and projects open for extended periods of time.

**[ENTERPRISE]** In the team development environment, versioning makes your changes visible to other members of the team, when they explore the repository or when they request a list of editions before replacing the one that is in the workspace. See the table below for considerations related to versioning projects, packages, and classes in the team environment.

To version an open edition:

1. In a browser or the Workbench window, select the program elements that you want to version. (You can make multiple selections by holding down the Ctrl key.)
2. From the program element pop-up menu, select **Manage** > **Version**. The Versioning Selected Items SmartGuide appears.
3. Follow the instructions in the SmartGuide.

To verify that a program element has been versioned, use its pop-up menu to view its properties. You can also see the new version names, instead of the timestamps that mark open editions, in the Workbench and in browser title bars and status lines. If you do not see timestamps or names, click the Show Edition Names 

button.

**[ENTERPRISE]** If you have just versioned a package, and you or other team members plan to continue changing classes or interfaces within that package, you should create a new open edition *immediately after versioning* the package. Otherwise, each developer who changes a class will end up with a different scratch edition of the package. If you want the team baseline to be updated whenever class owners release changes, release the open edition of the package when you create it.

**[ENTERPRISE]** The following considerations govern versioning:

| Program element | Considerations |
|---|---|

| | |
|---|---|
| Project | • Only the project owner can version an open edition of the project.<br>• Ensure that your workspace contains the latest editions of packages that make up the project, as this is the configuration that will be preserved by versioning. To load the latest editions that have been released by the package owners, select **Replace with** > **Released Contents** from the project's pop-up menu.<br>• All contained program elements must be versioned and released before the project can be versioned:<br>– Open editions of packages and classes that you do not own must be versioned and released by their owners, before you can version the project.<br>– VisualAge for Java will automatically version all contained program elements that you own, when you version the project.<br>– VisualAge for Java will automatically release all versioned packages and classes, regardless of owner, when you version the project. |
| Package | • Only the package owner can version an open edition of the package.<br>• Ensure that your workspace contains the latest editions of classes that make up the project, as this is the configuration that will be preserved by versioning. To load the latest editions that have been released by the class owners, select **Replace with** > **Released Contents** from the package's pop-up menu.<br>• All contained class editions must be versioned and released before the package can be versioned:<br>– Open editions of classes that you do not own must be versioned by their developers, and released by their owners, before you can version the package.<br>– VisualAge for Java will automatically version all contained classes that you developed, and release versioned classes that you own, when you version the package. |
| Class or interface | • Only the class *developer* can version the open edition of a class. (To see who the developer is, check the class's properties.) |

| | |
|---|---|
| Method | • Methods are automatically versioned when the containing class is versioned. |

**RELATED CONCEPTS**
Editions and versioning
Baselines, releasing, and reloading
Ownership and team roles - overview
Scratch editions

**RELATED TASKS**
Finding unversioned editions in the workspace
Releasing a program element
Building a team baseline
Creating an open edition
Managing editions of program elements
Comparing editions of a program element
Replacing editions in the workspace (reloading)
Searching for a program element in the repository

## Releasing a program element

In VisualAge for Java, Enterprise Edition, you *release* a class or package to update the team baseline. A baseline is the combination of class editions that make up a specific edition of a package, or the combination of package editions that make up a specific edition of a project.

Releasing is very important in the team development environment, because it determines exactly which editions are added to the workspace when a team member performs any of the following actions:

- Add a project or package to the workspace.
- Select **Replace with Released Edition** for a package or class.
- Select **Replace with Released Contents** for a project or package.

**Releasing a class or package into its containing program element**
To release packages and classes:

1. In a browser or the Workbench window, select the editions that you want to release. (You can make multiple selections by holding down the Ctrl key.)
2. From the pop-up menu, select **Manage > Release**.

Once you have released the editions, the unreleased (>) marker will no longer appear beside their names in the Managing page of the Workbench window. The open edition of the containing project or package will be updated with the newly released edition of the class or package. Team members who had previously added the project of package to the workspace *are not notified* when the baseline is changed. Inform the team when you release a class or package, so they can take the appropriate action to replace the edition in their workspaces.

To verify the last released edition, select **Properties** from the program element's pop-up menu and then select the **Info** page of the Properties notebook.

The following considerations govern releasing:

| Program element | Consideration |
|---|---|
| Project | • Not applicable. |

| | |
|---|---|
| Package | • Both open and versioned editions of packages can be released.<br>• The project into which you are releasing must be an open edition.<br>• You must be the package owner or the project owner.<br>• When you create a package, VisualAge for Java automatically releases the initial open edition of the package.<br>• When you version a project, VisualAge for Java automatically releases any unreleased packages that it contains, irrespective of who owns the package. |
| Class | • Only versioned editions of classes can be released.<br>• The package into which you are releasing must be an open edition.<br>• You must be the class owner.<br>• When you version a package, VisualAge for Java automatically versions and releases the contained classes that you own. |
| Method | • Methods are automatically released when you save them. |

**RELATED CONCEPTS**
Editions and versioning
Baselines, releasing, and reloading
Ownership and team roles - overview
Workspace
**RELATED TASKS**
Finding unreleased editions in the workspace
Managing editions of program elements
Versioning a program element
Replacing editions in the workspace (reloading)
Searching the workspace by edition status, owner, or developer
Building a team baseline

## Creating a scratch edition

Scratch editions are private. They reside in the workspace; no one else can see them in the shared repository. In the workspace, you can have scratch editions of projects or packages, open editions of classes contained in scratch editions of packages, and open editions of packages contained in scratch editions of projects.

If you have configured your VisualAge for Java options to show edition names, your scratch editions will be designated with < > around the program element's version name:

```
PackageA <1.0>
PackageB 1.2
```

In the example above, PackageA is a scratch edition that was created from a versioned edition called 1.0. PackageB is not a scratch edition; it is a versioned edition.

You may use a scratch edition to experiment, for example to learn how someone else's code works, or to test a change that you think the program element's owner should make. You can version program elements that are contained in a scratch edition, but you *can not release* them.

To create a scratch edition of a package, do *one* of these things:

- Modify a class contained in a versioned edition of a package, and then save your changes. A scratch edition of the package will be created automatically.
- Replace the edition of a class in a versioned package with another edition of that class. A scratch edition of the package will be created automatically.

To create a scratch edition of a project, do *one* of these things:

- Create a new open edition of a package that is a scratch edition. A scratch edition of the project will be created automatically.
- Create a new open edition of a versioned package contained in a versioned edition of a project. A scratch edition of the project will be created automatically.

To find all of your scratch editions at once, select the **Management Query** tool from the Workspace menu, and specify **Scratched** as one of your search criteria.

**RELATED CONCEPTS**
Scratch editions
Editions and versioning
Baselines, releasing, and reloading
Ownership and team roles - overview
Workspace
**RELATED TASKS**
Versioning a program element
Creating an open edition
Releasing a program element
Replacing editions in the workspace (reloading)
Searching the workspace by edition status, owner, or developer

## Replacing editions in the workspace (reloading)

The workspace contains only one edition of any program element at a time. The repository contains all editions. At times, you will want to replace the edition in the workspace with an earlier edition from the repository, for example to back out code changes. At other times, you will want to replace it with a newer edition, to catch up with changes that other team members have made. In all cases, the edition that you replace will be removed from the workspace but it will continue to exist in the repository.

Replacing the edition that is in the workspace is also called reloading. Reloading a project or package also reloads the contained packages and classes. Reloading a method removes all breakpoints from the method.

To reload a project, package, class, interface, or method, select **Replace with** from the program element's pop-up menu in the Workbench or a browser. A cascaded menu shows you what replacement options are available. You can replace more than one program element at a time by holding down the Ctrl key when you make your selections.

To verify exactly what you have in the workspace after reloading, click the **Show Edition Names**  button.

**[ENTERPRISE]** In the team development environment, reload projects or packages to synchronize with a team baseline. To do this, select **Replace with** > **Released Contents** or **Replace with** > **Released** from the project or package's pop-up menu in the Workbench.

**Choosing a specific edition to reload**
To see the editions that are in the repository and replace the edition in the workspace with one of them:

1. Select **Replace With** > **Another Edition** from the program element's pop-up menu. The Select Replacement for... window will appear, listing all of the editions that are in the repository.
2. Select an edition from the list. The bottom pane of the Select Replacement for... window will show the program source.
3. Click **OK**.

The edition that you selected will be loaded into the workspace.

**[ENTERPRISE] Reloading a team baseline**
To reload all of the classes for a package in the workspace, select **Replace with > Released Contents** for the package. The class versions that have most recently been released *into that edition of the package* will be loaded into the workspace. Similarly, selecting **Replace with > Released Contents** for an edition of a project will reload all contained package and class editions.

To reload one or more individual classes, select **Replace with > Released Edition** from their pop-up menu.

**RELATED CONCEPTS**
Editions and versioning
Baselines, releasing, and reloading
Repository
Workspace
Scratch editions

**RELATED TASKS**
Searching for a program element in the repository
Searching the workspace by edition status, owner, or developer
Creating an open edition
Versioning a program element
Releasing a program element
Building a team baseline

## Saving the workspace

Your source code changes are automatically saved in the repository every time you save a method. By contrast, the following workspace information is only saved when you select **Save Workspace** from the **File** pull-down menu, or when you exit the IDE:

- A record of which specific editions of which program elements are in your workspace
- IDE options that you have set

- Sizes, positions, contents, selections, and bookmarks of VisualAge for Java windows
- Breakpoints that you have added to methods
- Contents of the Scrapbook
- Contents of the Log
- Contents of the Console
- [ENTERPRISE] The server and repository to which you are connected
- [ENTERPRISE] The name of the workspace owner

You should save the workspace when you have made significant changes to the items listed above. You should also save your changed methods frequently. These actions will ensure that your work can be recovered in the event of a system failure.

See the topics listed below for links to information on backing up the workspace and maintaining multiple versions of the workspace.

**RELATED CONCEPTS**
Workspace
Team client/server configuration

**RELATED TASKS**
Providing a standard workspace
Saving changes to code
Adding classes and methods from the repository to the workspace
Adding projects and packages from the repository to the workspace
Replacing editions in the workspace (reloading)
Setting IDE options
Connecting to a shared repository
Recovering from a server failure

**RELATED REFERENCES**
Important files to back up
IDE failure or corrupted workspace

## Building a team baseline

Baselines allow team developers to synchronize the editions that they have in their workspaces, to have a common view of the application, and to catch inconsistencies in their work.

**Updating a team baseline**
A class owner updates a package baseline by creating a new class in the package, adding an existing class to the package, releasing an updated class into the package, or deleting a class from a package.

A project owner updates a project baseline by creating a new package in the project, adding an existing package to the project, releasing an edition of a package into the project, or deleting a package from the project. A package owner can also update the project baseline by releasing or deleting a package.

Only open editions of packages and projects can be modified in this manner. When the package or project is versioned, that particular baseline is frozen. When the package or project owner creates a new open edition, the team can start building a new baseline from that point.

**Synchronizing with a aseline**
Team members load a baseline by adding a project or package to their workspaces. This automatically loads the class versions most recently released into that edition of the project or package from the shared repository.

When team members want to resynchronize with a baseline, they reload by selecting the open edition of the project or package in the Workbench window, and then selecting **Replace with** > **Released Contents** from the program element's pop-up menu. This action refreshes all of the class editions in the workspace with the versions most recently released into that edition of the package or project.

**RELATED CONCEPTS**
Team development - overview
Baselines, releasing, and reloading
Team development scenarios - introduction
Team development scenario - single package, multiple developers
Team development scenario - multiple packages, multiple developers
Sample life cycle of an application

**RELATED TASKS**
Creating a class
Creating a package
Adding classes and methods from the repository to the workspace
Adding projects and packages from the repository to the workspace
Releasing a program element
Deleting program elements from the workspace
Replacing editions in the workspace (reloading)
Adding projects and packages from the repository to the workspace

## Managing editions of program elements

Edition management in a team development environment can become complex when there are many developers, program elements and editions. The Managing page of the Workbench consolidates information about team editions, and is a convenient place to perform activities such as versioning, releasing, and replacing editions of program elements in your workspace.

The Workspace menu's **Management Query** selection allows you to search the workspace, using different combinations of the following search criteria:

- Search by edition status (open, versioned, unreleased, scratch, or undefined)
- Search by kind of program element (type, package, or project)
- Search by scope (workspace or working set)
- Search by owner
- Search by developer

This is very useful, for example if you are a class developer and you want to know which of your classes you have not versioned, or you are an owner who wants to know which of your program elements you have not released. From the search results list, you can select editions and use their pop-up menus to browse, version, release, delete from the workspace, or replace the edition in the workspace with another edition from the repository. You can also copy from the search results list to the system clipboard.

For more information on using the management query tool, refer to the related information on searching the workspace by edition status.

**RELATED CONCEPTS**
Editions and versioning
Baselines, releasing, and reloading
Ownership and team roles - overview

**RELATED TASKS**
Searching the workspace by edition status, owner, or developer
Creating an open edition
Versioning a program element
Releasing a program element
Building a team baseline
Replacing editions in the workspace (reloading)
Changing a program element's owner

## Finding unreleased editions in the workspace

Editions that have not yet been released are marked with > beside their names in the **Managing** page of the Workbench window. In the following example, the open edition of PackageA has been released, but the versioned edition of PackageB and the open edition of PackageC have not been released.

```
PackageA (3/28/98 4:21:15 PM)
>PackageB 1.2
>PackageC (4/12/98 10:15:11 AM)
```

You can use the Management Query tool to find all the unreleased editions that are in your workspace. Here is an example of searching for unreleased editions that you own:

1. From the Workspace menu, select **Management Query**.
2. In the Status area of the Management Query window, select **Unreleased**.
3. In the Owners area, select **Current User**.
4. Click the **Start Query**  button.

The side pane of the Management Query window will show the search results:

- For packages, the search results include both open and versioned editions.
- For classes and interfaces, the search results show editions that have been versioned but not released.

**RELATED CONCEPTS**
Editions and versioning
Baselines, releasing, and reloading

**RELATED TASKS**
Finding unversioned editions in the workspace
Searching the workspace by edition status, owner, or developer
Releasing a program element
Building a team baseline
Replacing editions in the workspace (reloading)

## Finding unversioned editions in the workspace

To tell whether an edition is open or versioned, look at its edition name in VisualAge for Java browsers and in the Workbench window. (If you do not see edition names, click the Show Edition Names  button.)

Open editions have a date and timestamp (in parentheses) showing when they were created. Versioned editions have actual names, which you assign when you version them. In the following example, FredsClass and KimsClass have been versioned, while MyClass is still an open edition.

```
FredsClass 1.3
KimsClass KP-4Feb-Fix Show()-1.2
MyClass (03/08/98 12:51:32 PM)
```

You can use the Management Query tool to find all the unversioned editions that are in your workspace. Here is an example of how you would search for unreleased editions that you own:

1. From the Workspace menu, select **Management Query**.
2. In the Status area of the Management Query window, select **Open Edition**.
3. In the Owners area, select **Current user**.
4. Click the **Start Query**  button.

Depending on what other search criteria you selected, the side pane of the Management Query window will show your unversioned projects, packages, and classes.

**RELATED CONCEPTS**
Editions and versioning
Baselines, releasing, and reloading
**RELATED TASKS**
Finding unreleased editions in the workspace
Searching the workspace by edition status, owner, or developer
Versioning a program element
Replacing editions in the workspace (reloading)

## Viewing a class or interface's developer

Classes and interfaces can only be versioned by the user who developed them. To see who is the developer for a class or interface, select the program element in any browser or in the Workbench window. The developer's name will appear in parentheses in the status line at the bottom of the window. (When you select an edition of a project or package, the status line will show you the *owner's* name.)

You can also see who developed a particular class or interface by selecting **Properties** from the program element's pop-up menu.

**RELATED CONCEPTS**
Ownership and team roles - overview
Editions and versioning
**RELATED TASKS**
Changing a program element's owner
Viewing a program element's owner
Searching the workspace by edition status, owner, or developer

## Viewing a program element's owner

To see who owns a project or package in the workspace, select the program element in any browser or in the Workbench window. The owner's name appears in the status line at the bottom of the window. (When you select an edition of a *class or interface*, the status line will show you the *developer's* name.)

You can also use the Managing page of the Workbench window to find out who owns program elements that are in your workspace:

- When you select a project from the Projects pane, the owner's name appears in the Project Owner pane.
- When you select a package from the Packages pane, the owner marker (>) appears next to the owner's name in the Package Group Members pane.
- When you select a class or interface from the Types pane, the owner's name appears in the Type Owner pane.

You can also see who owns a program element by selecting **Properties** from the element's pop-up menu.

**RELATED CONCEPTS**
Ownership and team roles - overview
Editions and versioning
**RELATED TASKS**
Changing a program element's owner
Viewing a class or interface's developer
Searching the workspace by edition status, owner, or developer

## Changing a program element's owner

In the team development environment of VisualAge for Java, change control is based on ownership. At times, you will want to reassign ownership of program elements, for example when someone leaves the team.

Here are the rules governing change of ownership for program elements:

| Program element | Who is authorized to change the owner | Who is eligible to be the new owner |
|---|---|---|
| Class | The administrator or any member of the package group | Any member of the package group |
| Package | The administrator or the package owner | Any member of the package group |
| Project | The administrator or the project owner | Anyone on the repository user list |

To change the owner of a program element:

1. Change workspace owner to the appropriately authorized user, based on the table shown above. If password validation has been enabled, you will be prompted for a password.
2. In the Workbench, click the **Managing** tab. In the Managing page, the Project Owner, Package Group Members, and Type Owner panes display owner information for selected program elements. The owner marker (>) appears beside the names of package owners in the Package Group Members pane.

3. Select the program elements whose ownership you want to change. From the pop-up menu, select **Manage** > **Change Owner**. A list of eligible users will appear.
4. Select the name of the user who will be the new owner, and click **OK**.

The new owner's name will now appear in the appropriate pane at the bottom of the Workbench's Managing window.

**RELATED CONCEPTS**
Ownership and team roles - overview
Package groups
**RELATED TASKS**
Viewing a program element's owner
Searching the workspace by edition status, owner, or developer
Changing workspace owner
Adding members to a package group
Enabling password validation - overview

## Adding members to a package group

Before developers can own, create, or release classes in a given package, they must be members of the appropriate package group. Package group members can also change ownership of classes in the package.

Only the package owner can change the membership of the package group. To see who the owner is, select the package on the Managing page of the Workbench window, and look for the owner marker (>) in the Package Group Members pane.

Users must be in the repository user list before they can be added to a package group.

To add users to a package group, do the following steps:

1. In the Workbench, click the **Managing** tab.
2. On the Managing page, select one or more packages. If you select only one, the members of the group will be listed in the Package Group Members pane.
3. Click mouse button 2 to open the pop-up menu for the selected packages, and select **Manage** > **Add User to Group**. The Add Users dialog box will show a list of repository users who are not yet members of the package group.
4. Select one or more user names, and click **OK**.

The users will be added to the appropriate package groups. To verify, select each package and review the list of names in the Package Group Members pane.

**Removing members from a package group**
To remove users from a package group:

1. In the Workbench, click the **Managing** tab.
2. On the Managing page, select a package. The Package Group Members pane will list the team members who are currently in the group.
3. Select one or more user names.
4. Click mouse button 2 to open the pop-up menu for the selected names, and select **Remove**.

The users' names will be removed from the list of group members.

**RELATED CONCEPTS**
Ownership and team roles - overview
Package owner
Package groups

**RELATED TASKS**
Adding users to the repository user list
Changing a program element's owner

## Viewing information about your repository connection

To see details about the repository to which the workspace is currently connected, do the following steps.

1. From the **Window** menu, select **Repository Explorer**. The Repository Explorer window will open.
2. From the **Admin** menu, select **Properties**. The Properties dialog box appears, showing information about the repository file and the repository's contents.

If you are connected to a repository on a server, the Repository field in the Properties dialog box will show the repository name in *server*::*filename* format. Here is an example:

```
teamserv::team1.dat
```

If you are connected to the local repository, the Repository field in the Properties dialog box will display path information for the .dat file.

**RELATED CONCEPTS**
Repository

**RELATED TASKS**
Changing repositories
Connecting to a shared repository

**RELATED REFERENCES**
Repository files

## Changing repositories

The workspace can only be connected to one repository at a time. You can change repositories, for example to browse program elements developed by another team. You can change to another shared repository, perhaps on a different server, or you can change to a local repository on your client workstation.

When you exit the IDE, VisualAge for Java will save the server and directory names for your last connection, in the client's ide.ini file. The next time you start the IDE, your workspace will connect to that repository. To confirm which repository you are currently using, select **Properties** from Admin pull-down menu in the Repository Explorer window.

**Changing to a shared repository on a server**
To connect your workspace to a shared repository on a server:

1. It is recommended that you delete projects from your workspace before connecting to a repository that does not contain those projects.
2. From the Repository Explorer window, select **Admin** > **Change Repository**. The Select repository dialog box will appear.

3. Select **Use a shared repository with EMSRV server address**. In the entry field, type the IP address or host name of the server where the shared repository resides.
4. Click **Browse**. A second dialog box will appear, listing the repositories (.dat files) that are available in that server's working directory.
5. Select the repository file that you want to use, and click **Open**. (To navigate through the server directory structure, double-click entries in the Directories pane.) The first dialog box will reappear, with the name of the repository entered.
6. Click **OK**.
7. If you are not on the user list for the new repository, you will be asked to choose a new workspace owner. (VisualAge for Java compares the unique name, not the full name, when it checks the repository user list.) Select an owner name and click **OK**. If password protection has been enabled on the repository server, you will need to provide the new workspace owner's password.
8. A message will confirm that the workspace is being connected to the new repository. If there are inconsistencies between the workspace and the new repository, a message will instruct you to check the Log. Click **OK** and open the Log window.

If you attempt to browse a program element that does not reside in the new repository, you will see the text "Source code not available" in the browser's Source pane. If you plan to continue working with this repository, select Save Workspace from the File menu. This action will ensure that the next time you start the IDE, you will be connected to the same repository and you will have the same editions in your workspace.

**Changing to a repository on your workstation**

To connect your workspace to a local repository on your own hard drive:

1. It is recommended that you delete projects from your workspace before connecting to a repository that does not contain those projects.
2. From the Repository Explorer window, select **Admin** > **Change Repository**. The Select repository dialog box will appear.
3. Select **Use a local repository** and click **Browse**. A second dialog box will appear, showing the contents of the VisualAge for Java program directory on your machine.
4. Navigate through the directory structure until you see the repository (.dat file) that you want to use. Select it and click **Open**. The first dialog box will reappear, with the name of the repository entered.
5. Click **OK**.
6. If you are not on the user list for the new repository, you will be asked to choose a new workspace owner. (VisualAge for Java compares the unique name, not the full name, when it checks the repository user list.) Select an owner name and click **OK**.
7. A message will confirm that the workspace is being connected to the new repository. If there are inconsistencies between the workspace and the new repository, a message will instruct you to check the Log. Click **OK** and open the Log window.

If you attempt to browse a program element that does not reside in the new repository, you will see the text "Source code not available" in the browser's Source pane. If you plan to continue working with this repository, select Save

Workspace from the File menu. This action will ensure that the next time you start the IDE, you will be connected to the same repository and you will have the same editions in your workspace.

**RELATED CONCEPTS**
Team client/server configuration
Workspace
Repository
Repository user list
Repository administrator
Workspace owner

**RELATED TASKS**
Connecting to a shared repository
Changing workspace owner
Adding users to the repository user list
Enabling password validation - overview
Changing the EMSRV working directory
Saving the workspace

**RELATED REFERENCES**
Repository files
EMSRV startup parameters

## Importing from another repository

If you need projects or packages that are in another repository, you can import them into your current repository and then add them to your workspace.

You can only import versioned projects and packages. Imported program elements retain their version names and comments.

**[ENTERPRISE]** Imported program elements retain their ownership settings. Owners, class developers, and package group members who do not yet exist in the target repository's user list are added to it automatically. Program elements imported from VisualAge for Java, Professional Edition, are owned by the repository administrator.

**Procedure**
To import projects or packages from another repository:

1. In the Workbench window, select **File > Import**. The Import SmartGuide will open.
2. Select **Repository** and click **Next** to go to the next page.
3. Continue following the instructions in the SmartGuide. After selecting information about the repository location, projects, and packages, click **Finish**.

The Log window will record which program elements have been imported. You can now browse the imported program elements from the Repository Explorer window. If you want to make changes to them, you must add them from the repository to your workspace.

**RELATED CONCEPTS**
Repository
Workspace

**RELATED TASKS**
Changing repositories

Searching for a program element in the repository
Exporting to another repository
Adding projects and packages from the repository to the workspace
Importing files from the file system
Changing a program element's owner

**RELATED REFERENCES**

Repository files

## Exporting to another repository

Exporting lets you copy versioned projects or packages to another repository, for example to exchange program elements with another developer.

**[ENTERPRISE]** You might export to promote your work to a test repository on another server, to divide a shared repository in two, or to create a standalone repository for working at home. For more information, see the related tasks on changing repositories, dividing a repository, and working at a standalone workstation.

To export projects or packages to another repository:

1. In the Workbench window, select at least one project or package, and then select **Export** from the pop-up menu. The Import SmartGuide will open.
2. Select **Repository** and click **Next** to go to the next page of the SmartGuide.
3. Continue following the instructions in the SmartGuide. After selecting information about the server, repository, projects, and packages, click **Finish**.

The Log window will record which program elements have been exported. Another user of VisualAge for Java Version 2.0 can now import from the repository into which you have exported your program elements.

**[ENTERPRISE]** Developers who connect to the target repository can browse the exported program elements in the Repository Explorer window and add the exported program elements to their workspaces.

**[ENTERPRISE]** Exported program elements retain their ownership settings. Owners, class developers, and package group members who do not yet exist in the target repository's user list are added to it automatically.

**[ENTERPRISE]** If you are creating a new repository for development purposes, remember to export the base libraries on which your classes depend. If you forget to include any program elements, you can export them into the same target repository later. There are four base projects:

- IBM Java Implementation
- Java class libraries
- JFC class libraries
- Sun class libraries

**RELATED CONCEPTS**

Repository
Workspace

**RELATED TASKS**

Creating a repository
Dividing a repository

Backing up the repository
Backing up a shared repository
Changing repositories
Searching for a program element in the repository
Importing from another repository
Working at a standalone workstation
Changing a program element's owner
Exporting code
Exporting bytecode to the file system
Exporting source code to the file system

**RELATED REFERENCES**
Repository files

## Purging program elements from the repository

Purging marks projects or packages for deletion from the repository. Purged program elements do not appear in the Repository Explorer window, but they exist in the repository and can be restored until the repository is compacted. Purging program elements does not free up disk space. It is a preliminary step to compacting, which creates a smaller repository.

When you purge an edition of a *package*, you also purge the classes, interfaces, and methods contained in that package. This provides the greatest benefits when the repository is compacted later.

When you purge an edition of a *project*, you are only deleting information about that project's configuration of packages. You do not purge any contained program elements.

**[ENTERPRISE]** Program elements can only be purged by their owners or by the repository administrator.

**Purging program elements**
To purge projects and packages:

1. Delete the program elements from your workspace, prior to purging them from the repository.
2. **[ENTERPRISE]** Confirm that the projects and packages have been deleted from all other team members' workspaces.
3. From the **Window** menu, select **Repository Explorer**.
4. In the Repository Explorer window, select the **Projects** or **Packages** page, according to what you want to purge.
5. Select the **Project Name**, **Package Name**, or **Edition** that you want to purge. Selecting a project or package by name will purge *all* editions of that program element. Hold down the Ctrl key to make multiple selections.
6. From the pop-up menu of the selected elements, select **Purge**. A message will appear, asking you to confirm the purge operation.
7. Click **OK**.

The purged items will no longer appear in the Repository Explorer window. If you try to load a project that contained a purged package edition, an error message will indicate that the project could not be loaded because one of its packages "does not exist in the repository". (In fact, the package is still in the repository, and can be restored until the repository is compacted.)

**RELATED CONCEPTS**
Repository
Repository administrator
Ownership and team roles - overview

**RELATED TASKS**
Searching for a program element in the repository
Compacting a repository
Restoring program elements
Backing up the repository
Backing up a shared repository
Optimizing server performance

**RELATED REFERENCES**
Repository files

## Restoring program elements

Purging marks projects or packages for deletion from the repository. After a program element is purged, it no longer appears in the Repository Explorer, but it continues to exist in the repository until the repository is compacted to free up disk space.

If the repository has not been compacted, purged program elements can be restored, allowing you to browse and add them to the workspace once again. To restore purged program elements, follow these steps:

1. From any **Window** menu, select **Repository Explorer**. The Repository Explorer window will open.
2. Select the **Projects** or **Packages** page, depending on what you want to restore.
3. To restore all editions of a project or package, place the cursor in the **Project Names** or **Package Names** pane. To restore selected editions of a project or package, place the cursor in the **Editions** pane. Select **Restore** from the pop-up menu. A list of restorable names or editions will appear.
4. Select the items you wish to restore to the current repository. Click **OK**.

The restored program elements will re-appear in the Repository Explorer.

**RELATED CONCEPTS**
Repository
Repository administrator

**RELATED TASKS**
Purging program elements from the repository
Searching for a program element in the repository
Compacting a repository

**RELATED REFERENCES**
Repository files

## Working at a standalone workstation

As a team developer, you may sometimes need to work away from the office. You can do this by creating a repository to use when you are not connected to the LAN.

Here is an example of how you might replicate program elements from the server for use on a home computer. In the example, the home computer has its own local repository and its own copy of VisualAge for Java, Enterprise Edition.

1. While connected to the shared repository, version the packages you need to work with.
2. Export those packages to a temporary repository on the server. Call the new repository home.dat.
3. Copy home.dat from the server to an offline medium, for instance diskette.
4. Start the IDE on your home computer and connect to your default local repository (ivj.dat).
5. Copy home.dat onto your home computer and import its packages to ivj.dat.
6. Use the Repository Explorer to add the packages to your workspace. (If they are already in your workspace, reload them by selecting **Replace**> **with Another** from their pop-up menus.)
7. Open a new edition of the packages whose classes you need to change. Modify the classes as required, and then version and release them.
8. Reverse the process to transport your work back to the shared repository: on your home computer, version the changed packages and export them to another repository; copy the results of the export to an offline medium; copy the portable repository to the server; import from it to the shared repository; reload the new versions.

There are variations on this approach:

- If the server and the home computer have the appropriate hardware, you can eliminate the two copy steps by exporting to a Zip disk.
- If the client is a laptop, you could import your versioned packages directly from the shared repository to a local repository on the laptop's hard drive, and then change to that repository before leaving the office. (If you forget to change repositories while you are still connected to the LAN, you can still connect to your local repository by editing the client's ide.ini file. For more information, see the related topic on connecting to a shared repository.)

**RELATED CONCEPTS**
Repository
Team client/server configuration
The depository server (EMSRV)

**RELATED TASKS**
Importing from another repository
Exporting to another repository
Changing repositories
Connecting to a shared repository

**RELATED REFERENCES**
Repository files

## Sharing resource files

Resource files, such as images or sound files, are created outside the IDE and stored in the file system. VisualAge for Java does not store resource files in the shared repository.

When you create or import a project, VisualAge for Java automatically creates a subdirectory for it on the client machine's file system. For example, on a Windows NT workstation, for a project called ProjectX, a directory called IBMVJava\Ide\project_resources\ProjectX is created. By default, this is where VisualAge for Java will look for resource files when you run programs or applets in that project, or when you publish them or export them to a JAR file.

As a team developer, you will need to share resource files with other members of your team. You can do this by means of a *shared resource directory*, which VisualAge for Java will search in addition to the local directory on the client. If a resource file exists in both the local directory and the shared directory, the local copy will be used.

Here is an example of how a team working on ProjectX might use a shared resource directory. This example is for a Windows NT environment.

1. Using the file system, the administrator creates a directory for the team's resource files, in a shared file location. For example, this could be a directory called j:\resource, on the server.
2. The administrator grants team members access to the shared resource directory.
3. The administrator or the project owner creates a subdirectory for each project, for example j:\resource\ProjectX.
4. In the Workbench, each team member selects **Windows > Options** to open the Options dialog.
5. On the General page of the Options dialog, team members select **Use shared resources** and enter j:\resource in the **Shared resource path** field. This action causes VisualAge for Java to search the j:\resource\ProjectX directory on the server, for resource files that it can not find in the IBMVJava\Ide\project_resources\ProjectX directory on the client.
6. Class developers create and test resource files in their local resource directories.
7. Class developers move their resource files to the shared resource directory on the server, to share them with the rest of the team. (This activity may be coordinated with the project owner.)
8. The administrator backs up the shared resource directory at the same time as the shared repository.

If you move packages from one project to another, remember to move or copy the associated resource files from the old project's subdirectory to the new project's subdirectory.

**RELATED CONCEPTS**

Team development - overview
Team client-server configuration
Ownership and team roles - overview

**RELATED TASKS**

Including resource files in a project
Exporting code
Backing up a shared repository

# Chapter 4. Team administration

## TCP/IP network considerations in team development

In the VisualAge for Java team development environment, all servers and clients are connected by means of a TCP/IP network. VisualAge for Java does not provide the TCP/IP software itself; typically your operating system would provide TCP/IP support.

The default limit for client connections to a server is 256. This limit can be changed by using the **-M** parameter of the **emsrv** command. Some TCP/IP stacks will run out of stream sockets before this limit is reached.

**RELATED CONCEPTS**
Team client/server configuration
The repository server (EMSRV)
Server considerations in team development

**RELATED TASKS**
Setting up a team server - overview
**RELATED REFERENCES**
EMSRV startup parameters
EMSRV and TCP/IP

## Server considerations in team development

The repository server (EMSRV) must be installed on any computer where one or more shared repositories will reside.

You may have one or more servers in your team development environment. Below are some issues to consider when planning where to install shared repositories and the repository server.

**Capacity and availability**
Run EMSRV on server-class computers. For optimal availability and performance, servers should be dedicated; that is, shared repositories should not reside on a developer's workstation.

EMSRV uses TCP/IP for its client/server network connections. The default limit for client connections to a server is 256, but some TCP/IP stacks will run out of stream sockets before this limit is reached.

**Number and placement of shared repositories**
Repository planning considerations, including information on file sizes, are covered as a separate topic in this documentation.

**Ease of management**
It is simpler to manage one server than multiple servers. For example, it is easier to design a backup strategy for one server.

**Supported operating systems**
The following operating systems are supported as VisualAge for Java servers:

- Windows NT Workstation Version 4.0
- Windows NT Server Version 4.0
- OS/2 Warp Version 4.0
- OS/2 Warp Server 4.0
- AIX Version 4.2.1
- HP-UX Version 10.20
- Sun Solaris Version 2.6
- Novell NetWare Versions 3.12, 4.1, and 4.11
- Novell intraNetWare Version 4.11

**RELATED CONCEPTS**
Team client/server configuration
The repository server (EMSRV)
Network considerations in team development
Server security
Number and placement of shared repositories

**RELATED TASKS**
Setting up a team server - overview
Optimizing server performance

**RELATED REFERENCES**
EMSRV restrictions
Repository files

## Server files and directories

**Server files**
The team development server requires the following files:

- The executable program for the repository server (emsrv.exe, emsrv.nlm, or emsrv)
- The repository server log file (default name emsrv.log)
- One or more shared repositories (default name ivj.dat)

The repository server must be installed on any computer where a shared repository will reside. The EMADMIN utility (emadmin.exe) may also be installed for local monitoring or stopping of the repository server.

It is not necessary to install the IDE on the server.

OS/2 Repositories that reside on HPFS drives will provide better performance.
WIN Repositories that reside on NTFS drives will provide better performance.

**Server directories**
VisualAge for Java repositories must reside on the same system as EMSRV; remote file systems are not supported.

The server files may reside in any directory on the server. It may be convenient to keep them together in the same directory, for the following reasons:

- If repository files are in the same directory, and if that directory is the EMSRV working directory, then team members do not have to provide path information to connect, export, import, or change repositories. See the related topics below, for links to more information on the EMSRV working directory.

- If repository files are all in one directory, it is easier to write a script to back them up.
- By default, the emsrv.log file is written in the EMSRV working directory. (To override the default, use the **-lf** startup parameter of the **emsrv** command.)

**Shared resources**
Resource files, such as images or audio clips, are not stored in the shared repository. By default, each developer creates and uses resources files in a local directory on the client. As an alternative, VisualAge for Java clients can use a shared resource directory. You may wish to plan storage space for a shared resource directory on the same server where the shared repository will reside. The LAN administrator would follow standard procedures to grant team developers access to the shared resource directory.

**File access rights**
All files created by the repository server are owned by the EMSRV user. The repository server has the file access rights of the EMSRV user. To ensure the integrity of shared repositories, you may wish to restrict rights for repository files to the EMSRV user.

**Planning for repository growth**
In the team development environment, it is quite common for the shared repository to reach a size of several hundred megabytes. Package owners should be encouraged to purge package editions that are no longer needed, so the administrator can compact the repository.

RELATED CONCEPTS
Team client/server configuration
Repository
The repository server (EMSRV)
Number and placement of shared repositories
Server considerations in team development
Server security
EMSRV user

RELATED TASKS
Setting up a team server - overview
Changing the EMSRV working directory
Creating a repository
Compacting a repository
Sharing resource files

RELATED REFERENCES
Repository files
EMSRV startup parameters

## Server security

There are different levels of security that you can implement for VisualAge for Java servers.

**Password validation**
If password validation is enabled on the repository server, team members must provide valid passwords to do these tasks:

- Connect to a repository managed by that server

- Change workspace owner

In all cases, the workspace owner's privileges determine what the developer who is using that workspace can do. For example, if a developer connects to the shared repository as Administrator, then that developer can purge any program element or change ownership of any program element.

The VisualAge for Java default is to run with *no* password validation on the repository server.

**File security**
The server comprises the following files:

- The executable file for the repository server (emsrv.exe, emsrv.nlm, or emsrv)
- The server log file (default name emsrv.log)
- One or more shared repositories (default name ivj.dat)

The only user who requires access to these files is the EMSRV user, under whose authority the repository server runs. (The repository server handles input/output requests on behalf of the clients.) You can add an additional measure of security by restricting access to only the EMSRV user. Do this using the standard facilities of your server operating system.

**Physical security**
For optimal performance and availability, the server should be a dedicated machine, not a developer's workstation. As with any kind of server, you should exploit hardware and software features like keyboard passwords, and you should consider the benefits of placing the server in a physically secure area.

**RELATED CONCEPTS**
Team client/server configuration
EMSRV user
Server files and directories
Server considerations in team development
Repository administrator

**RELATED TASKS**
Setting up a team server - overview
Enabling password validation - overview
Adding users to the repository user list

**RELATED REFERENCES**
Repository files

## Number and placement of shared repositories

In the team development environment, there will be at least one shared repository. You may decide to have more than one, residing on the same server or on different servers. Team members can change from one shared repository to another, but they can only be connected to one repository at a time.

Below are some issues to consider when deciding how many shared repositories the team will use, and where they will reside.

**Performance**
There are several factors that affect the time required for a client to connect to a

shared repository, and to work with the repository after connecting. Those factors include the number of clients using the same server, and the speed of the server itself.

**Repository growth and maximum size**
The source code repository, ivj.dat, will grow as team members experiment and take advantage of incremental development. It is not uncommon to have a repository that is several hundred megabytes in size. The administrator can reduce the size by compacting the repository after team members have purged any package editions they no longer need.

OS/2 The maximum repository size is 2 gigabytes.
NetWare The maximum repository size is 4 gigabytes.
WIN The maximum repository size is 2 gigabytes for FAT drives and 16 gigabytes for NTFS drives.
AIX HP-UX Solaris The maximum repository size is 16 gigabytes.

**Ease of management**
It is simpler to manage one shared repository than multiple repositories, and it is simpler to manage one server than multiple servers. For example, if everything resides in one repository then it is easier to ensure your developers have access to all of the program elements that they require. Trade-offs include performance and the effort required to divide a repository later.

**Team and project organization**
If most of your developers need access to each others' classes, then ideally they should use a single shared repository. This must be weighed against performance and server capacity considerations.

If your developers are working on very different projects and are not dependent on each other's classes, then you should consider designing your server and project structure so they are working with different repositories. You might start by having two or more repositories on one server to begin with, and then move them to different servers later if you need more capacity.

**Effort required to divide a repository**
If you decide, after several months of development, that your team should be working with multiple repositories, then the administrator will have to divide the repository that everyone has been using. One way to do this is to create a second repository, export selected program elements into it, and purge those program elements from the first repository. Another approach is to copy the existing repository, and purge what is not needed from both the original and the copy.

In any case, you must identify which group of developers needs which classes. This process may require reorganization of projects and packages, and may involve some trial and error.

**Server capacity**
Considerations for server selection are covered as another topic.

**Restrictions**
Repository files must reside on the same system as the emsrv executable program. The repository server does not support remote repositories.

**RELATED CONCEPTS**
Repository

Team client/server configuration
Server considerations in team development
Server files and directories
Team and project organization
Repository administrator

**RELATED TASKS**

Setting up a team server - overview
Creating a repository
Compacting a repository
Purging program elements from the repository
Dividing a repository
Optimizing server performance

**RELATED REFERENCES**

Repository files
EMSRV restrictions

## Team and project organization

Before the team starts a new application development project, you should discuss the following issues:

- How to organize the work
- How to structure the VisualAge for Java project, packages and classes
- Who should own each project, package, and class

After the design is complete, the appointed project owner should set up the project for the rest of the team.

**Organization and assignment of classes**

Once you know what classes will be required and how they will be grouped into packages, consider the following issues:

- Who will belong to each package group? These are the developers who can own, create, change, and delete classes in the package. The package group members are “trusted peers”; they can take ownership of any class in the package, at any time.
- Which developer is likely to make the most changes in each class? That developer should probably own that class.
- Are the developers dependent on classes in other packages? If not, perhaps you should ask the administrator to create a separate shared repository for this project. This would be simpler than dividing a large repository later.

**Organization and assignment of packages and projects**

Here are some other questions to answer before setting up the project in VisualAge for Java.

- Who will own the package? The package owner appoints members to the package group, monitors whether they have versioned and released their classes, and decides when the package is stable enough to release or version. The package owner should be available to re-open the package after it has been versioned so that class owners are not restricted to working in scratch editions. The package owner probably owns some classes in the package.
- Who will own the project? The project owner sets up the project by adding packages to it and assigning them to owners. The project owner coordinates the

activities of the package owners and versions the entire project. This person, who might have a job title like project leader or architect, probably also owns classes.

For an illustration of how the project manager would proceed to set up the project and how the team members would perform their roles, see the sample application life cycle that is described as a related topic.

For more a more detailed discussion of setting up the team development environment, see the IBM redbook, *VisualAge for Java Enterprise Team Support* (SG24-5245-00). For information on VisualAge for Java books, select the **Library** link at http://www.software.ibm.com/ad/vajava/.

**RELATED CONCEPTS**
Ownership and team roles - overview
Package groups
Sample life cycle of an application
Number and placement of shared repositories

**RELATED TASKS**
Creating a project
Creating a package
Adding users to the repository user list
Adding members to a package group
Changing a program element's owner

## Setting up a team server - overview

The administrator performs the following tasks to prepare a server for the team development environment. For more detailed information, see the links to related information at the end of this document.

1. Plan the server installation. Review the following subjects:
   - Network considerations
   - Server considerations
   - Number and placement of shared repositories
   - Server file and directory structures
   - Server security
2. Plan the team and project organization.
3. Install and configure TCP/IP on the server.
4. Install the VisualAge for Java server code. This action will install the EMSRV executable program and a repository called ivj.dat on the server. Refer to the readme.txt file on the product CD for information on how to install the product.
5. Decide which user account will be used to start EMSRV, and create the user account if necessary.
6. WIN Give the EMSRV user the necessary Windows NT privileges.
   NetWare Give the EMSRV user appropriate rights to any paths where repositories can reside.
7. WIN Install EMSRV as a service in the Windows NT registry. (As an alternative, you may wish to start EMSRV from a command line until you are familiar with the startup parameters, and then install it in the registry later.)

8. If native password validation will be used, create the user accounts on the server. If VisualAge for Java password validation will be used, create the passwd.dat file in the EMSRV working directory.
9. If it has been decided that more than one shared repository is necessary, create the additional repositories. For example, you might make copies of ivj.dat with different names, in the same directory.
10. Start EMSRV.
11. From a VisualAge for Java client, connect to the shared repository as Administrator, and add users to the repository list. If there will be multiple shared repositories, do this for each one.

**RELATED CONCEPTS**

Team client/server configuration
The repository server (EMSRV)
Network considerations in team development
Server considerations in team development
Number and placement of shared repositories
Server files and directories
Server security
Team and project organization
EMSRV user

**RELATED TASKS**

Installing EMSRV as a service in the Windows NT registry
Removing EMSRV from the Windows NT registry
Authorizing the EMSRV user (Windows NT)
Starting the repository server on Windows NT
Starting the repository server on OS/2
Starting the repository server on AIX, HP-UX, or Solaris
Starting the repository server on NetWare
Enabling password validation - overview
Connecting to a shared repository
Adding users to the repository user list
Creating a repository

**RELATED REFERENCES**

Repository files
EMSRV restrictions
EMSRV and TCP/IP
EMSRV startup parameters

## Installing EMSRV as a service in the Windows NT registry

You can install EMSRV in the Windows NT registry, if you prefer to start EMSRV as an NT service rather than from a command prompt.

There are two advantages to installing EMSRV as a service:

- You can specify automatic startup so that EMSRV will start whenever the repository server is booted.
- You can specify the default settings that you want EMSRV to use. For example, you might want to ensure that password validation is always enabled.

If EMSRV is started as a service, the default EMSRV working directory is the Windows NT system32\ directory. It is recommended that you *change this default* by using the **-W** parameter when you install EMSRV as a service in the Windows NT registry.

To install EMSRV as an NT service:

1. From a command prompt, change to the directory where the emsrv executable program is installed.
2. Issue `emsrv -install` *`[parameter2] [parameter3] ...`* The first parameter must be `-install`; the others are the EMSRV startup parameters that you have chosen for your environment.

   Here is an example:

   ```
   emsrv -install -u joe -p donttell -W j:\sharedrep -rn
   ```

   This example installs EMSRV as a service in the Windows NT registry, with `joe` as the EMSRV user name and `donttell` as joe's password. By default, the EMSRV working directory will be `j:\sharedrep` and native password validation will be enforced.

   A message will confirm that EMSRV has been installed.
3. From the Windows NT Control Panel, double-click **Services**. The Services dialog box will appear.
4. Select **EMSRV** from the list of services. In the Startup Parameters text box, type the EMSRV startup parameters that you want to use. If you are specifying the working directory for EMSRV to use, you must type an *extra backslash* for each backslash in the path. Here is an example:

   ```
   -u emsrvacc -p secret -W d:\\javateam
   ```
5. Click **Start**. A message will appear, informing you that EMSRV is starting.

EMSRV is now installed as a service in the registry and the necessary DLLs have been copied to the system directory. The parameters that you provided will be used, by default, whenever EMSRV is started. You can also override or add to these parameters if you start EMSRV manually from the **Services** icon of the Windows NT Control Panel.

**RELATED CONCEPTS**

The repository server (EMSRV)
EMSRV user

**RELATED TASKS**

Authorizing the EMSRV user (Windows NT)
Starting the repository server on Windows NT
Removing EMSRV from the Windows NT registry
Enabling password validation - overview
Enabling password validation with the passwd.dat file
Changing the EMSRV working directory
Displaying active EMSRV settings

**RELATED REFERENCES**

EMSRV startup parameters

## Removing EMSRV from the Windows NT registry

**Warning**: Removing EMSRV from the registry will also stop EMSRV if it is running. You should *not* stop EMSRV until all clients have disconnected. Otherwise, developers may not be able to save their workspaces.

To remove EMSRV from the registry:

1. Make sure no team members are currently connected to the repository server. To confirm this, issue `emadmin list` from the command prompt of any network-attached workstation where the EMADMIN utility is installed.
2. To stop the repository server, enter `EMADMIN stop`.
3. Enter `EMSRV -remove` .

EMSRV will be removed from the registry. To confirm this, double-click the **Services** icon in the Windows NT Control Panel. EMSRV no longer appears on the list of services.

**RELATED CONCEPTS**
The repository server (EMSRV)
EMSRV user

**RELATED TASKS**
Stopping the repository server
Installing EMSRV as a service in the Windows NT registry

**RELATED REFERENCES**
The EMADMIN utility - overview
The EMADMIN stop command
The EMADMIN list command

## Authorizing the EMSRV user (Windows NT)

The person who starts the repository server (EMSRV) must provide the name of a user account under whose privileges the repository server will run. This is known as the EMSRV user. The EMSRV user must meet the following two requirements:

- The user must be a member of the NT Administrators group
- The user must be granted the Windows NT advanced user right, “Act as part of the operating system”.

To authorize the EMSRV user to start the repository server:

1. Log in to Windows NT as an Administrator.
2. From the Start menu, select **Programs** > **Administrative Tools (Common)** > **User Manager**. The User Manager dialog box will appear.
3. If desired, create a new user to be the EMSRV user.
4. Still in the User Manager dialog box select **User Rights** from the **Policies** menu. (It does not matter which user’s name is selected when you do this.) The User Rights Policy dialog box will appear.
5. Select **Show Advanced User Rights**and then click the downarrow to see the Right pull-down list. The list should now include “Act as part of the operating system”.

6. Select **Act as part of the operating system** from the list, and click **OK**. The Grant To pane will list the users who currently have this privilege. Click **Add**. The Add Users and Groups dialog box will appear.
7. Click **Show Users**. Scroll down the list of users in the Names pane and select the **EMSRV user** from the list. Click **Add**. The EMSRV user's name will appear in the Grant To pane at the bottom of the Add Users and Groups dialog box. Click **OK**.
8. The EMSRV user's name now appears in the Grant To pane of the User Rights dialog box. Click **OK**.

The EMSRV user now has the Windows NT operating system privileges needed to start the repository server. If the user can not start EMSRV successfully, shut down Windows NT on the server and reboot the machine. It is sometimes necessary to take this action before changes in Windows NT privileges take effect.

**RELATED CONCEPTS**
The repository server (EMSRV)
EMSRV user

**RELATED TASKS**
Starting the repository server on Windows NT
Starting the repository server on OS/2
Starting the repository server on AIX, HP-UX, or Solaris
Starting the repository server on NetWare

## Starting the repository server on Windows NT

As the administrator, you must start the repository server (EMSRV) before clients can connect to shared repositories. You can start EMSRV from a command prompt or as a Windows NT service.

A full list of the EMSRV startup parameters is available from a reference link provided at the end of this topic. At a minimum, you must use the **-u** and **-p** parameters, to specify the EMSRV user's name and password.

**Prerequisite**
The EMSRV user must be part of the Administrators group in NT, and requires the Windows NT Advanced User Right, "Act as part of the operating system".

**Starting EMSRV from a command prompt**
To start EMSRV:

1. Change to the directory where the emsrv executable program is installed. EMSRV *must* be started from this directory.
2. Enter the **emsrv** command with the desired startup parameters. Here is an example:
   `emsrv -u emsrvacc -p secret -W d:\javateam`
   starts the repository server under the authority of a user called `emsrvacc`. The user's password is `secret`. The working directory where EMSRV will write its log and where it will search for repositories is `d:\javateam`.

Messages will be logged in the EMSRV log and in the DOS Command Prompt window, confirming that EMSRV has started and listing the parameters that are in effect.

### Starting EMSRV as an NT service

EMSRV must be installed in the Windows NT registry before you can start it as a service. For installation instructions, refer to the related tasks listed below.

When EMSRV is started as a service, the default EMSRV working directory is the Windows NT system32\ directory. It is recommended that you change this default by using the **-W** parameter when starting EMSRV as a service.

If you have installed EMSRV in the registry as an automatically started service, it will start whenever the Windows NT operating system is restarted. If you have installed EMSRV in the registry as a manually started service, you can start it by following these steps:

1. From the Windows NT Control Panel, double-click **Services**. The Services dialog box will appear.
2. Select **EMSRV** from the list of services. In the Startup Parameters text box, type the EMSRV startup parameters that you want to use. If you are specifying the working directory for EMSRV to use, you must type an *extra backslash* for each backslash in the path. Here is an example:

   ```
   -u emsrvacc -p secret -W d:\\javateam
   ```
3. Click **Start**. A message will appear, informing you that EMSRV is starting.

### Potential problems

The following table summarizes some errors that you may see when starting EMSRV as an NT service.

| Error message | Recommended action |
|---|---|
| An internal Windows NT error occurred. | • Verify that the startup parameters have been entered correctly:<br>– Were the EMSRV user's name and password correctly specified?<br>– If you specified an EMSRV working directory, did you include the extra backslashes in the path?<br>• Verify that the EMSRV user's password has not expired, by logging in to Windows NT as that user.<br>• Verify that the EMSRV user is a member of the Administrators group, and has the Windows NT Advanced User Right, "Act as part of the operating system". |
| The specified service is disabled and cannot be started. | The service may have been disabled:<br>1. From the Control Panel, click **Services**.<br>2. Select EMSRV from the list of installed services.<br>3. Click **HW Profiles**.<br>4. If EMSRV's original configuration shows as disabled, click **Enable**. |
| The process terminated unexpectedly. | EMSRV may have already been started from a command prompt. Use the **emadmin stat** command to check the status, or use the Windows NT Task Manager to look for EMSRV on the list of running processes. |

**Confirming that EMSRV is running**
To verify that EMSRV is running, issue the **emadmin stat** *hostname* command from any workstation where the EMADMIN utility is installed.

**RELATED CONCEPTS**
The Repository Server (EMSRV)
EMSRV User

**RELATED TASKS**
Setting up a team server - overview
Installing EMSRV as a service in the Windows NT registry
Authorizing the EMSRV user (Windows NT)
Stopping the repository server
Enabling password validation - overview
Changing the EMSRV working directory

**RELATED REFERENCES**
EMSRV startup parameters
The EMADMIN utility - overview

## Starting the repository server on OS/2

As the administrator, you must start the repository server (EMSRV) before clients can connect to shared repositories.

To prevent unauthorized remote shutdown of EMSRV, provide a password when you start it. For a full list of the EMSRV startup parameters that are available, refer to the reference link provided at the end of this topic.

To start EMSRV from an OS/2 command line:

1. Change to the directory where the emsrv executable program is installed.
2. Type the **emsrv** command with the desired startup parameters. Here is an example:
   `emsrv -p secret -W d:\javateam`
   where `secret` is the password that would be required to stop the repository server remotely and `d:\javateam` is the working directory where EMSRV will look for shared repositories.
   Press Enter.

Messages will be logged in the EMSRV log and in the OS/2 Command Prompt window, confirming that EMSRV has been started.

**RELATED CONCEPTS**
The repository server (EMSRV)
EMSRV user

**RELATED TASKS**
Setting up a team server - overview
Stopping the repository server
Enabling password validation - overview

**RELATED REFERENCES**
EMSRV startup parameters
The EMADMIN utility - overview

## Starting the repository server on AIX, HP-UX, or Solaris

As the administrator, you must start the repository server (EMSRV) before clients can connect to shared repositories.

A full list of the EMSRV startup parameters is available from a reference link provided at the end of this topic.

To start EMSRV:

1. Log in as the EMSRV user.
2. Change to the directory where the emsrv executable program is installed.
3. If your system is using shadow passwords, issue the **emsrv.shadow** command with the desired startup parameters. If your system is not using shadow passwords, issue the **emsrv** command instead.

Here is an example:

```
emsrv.shadow -w -lc -lflogfile
```

This example starts the repository server on an operating system that uses shadow passwords. Lock tracking is turned on, and messages are logged both to the system console and to a file called logfile.

Press Enter.

EMSRV will start on the server. To verify, issue the **emadmin stats** *hostname* command from any workstation where the EMADMIN utility is installed.

**RELATED CONCEPTS**

The repository server (EMSRV)
EMSRV user

**RELATED TASKS**

Setting up a team server - overview
Enabling password validation - overview
Stopping the repository server

**RELATED REFERENCES**

EMSRV startup parameters
The EMADMIN utility - overview

## Starting the repository server on NetWare

As the administrator, you must start the repository server (EMSRV) before clients can connect to shared repositories.

A full list of startup parameters is available from a reference link provided at the end of this topic. At a minimum, you must specify the EMSRV user's name and password, and a working directory. If you don't enter these three parameters at the console, you will be prompted as the NLM loads.

To get the NLM to load automatically when the NetWare file server is rebooted, you can add an appropriate command line to the file server autoexec.ncf file.

To load the EMSRV NLM, type `load emsrv` (with the desired startup parameters) at the NetWare console, and press Enter. The EMSRV for NetWare menu will appear at the server console.

Here is an example of a command for starting EMSRV from the server console, on a server that uses the Novell Directory Services (NDS) NLM:

```
load emsrv -u emsrvacc -p secret -W volname:\path -rn -SC nyc
```

The above example loads the NLM with the account name `emsrvacc` and password `secret`. The working directory where EMSRV will write its log and look for shared repositories is *volname:\path*. The -rn parameter indicates that native password validation should be enforced when users connect to the shared repository. Because native password validation is being used and because the server is running EMSRV for NetWare (NDS), the -SC parameter is also provided to specify the NDS context ( `nyc` ) for the network login names that the administrator supplied when adding users to the VisualAge for Java repository user list.

**RELATED CONCEPTS**
The repository server (EMSRV)
EMSRV user

**RELATED TASKS**
Setting up a team server - overview
Changing the EMSRV working directory
Enabling password validation - overview
Enabling native password validation
Adding users to the repository user list
Changing EMSRV settings (NetWare)
Stopping the repository server

**RELATED REFERENCES**
EMSRV startup parameters
The EMADMIN utility - overview
EMSRV restrictions

## Stopping a client connection

As the administrator, you may want to stop one or more client connections to the repository server, for example in preparation for backing up the shared repository.

**Warning**
Stopping a team client's connection to the server could corrupt that client's workspace, if the client was in the process of loading code from the repository. To see whether clients are active, use the **emadmin list** command to check the last time a request was issued.

**Stopping a client connection using the EMADMIN utility**
To stop a client's connection to the repository server:

1. Issue the **emadmin list** command to display the list of active connections. You will see information similar to the following:

```
EMSRV Connection list for: localhost
                  Active  Last
ID  IP Address    Locks   Request   Library
_____________________
0   9.21.35.196     0     19:37:08  ivj.dat
1   9.25.32.196     0     18:12:19  ivj.dat
```

2. Use the ID information you have just obtained to identify the **connection number** that you want to stop. In the example above, you may decide that connection 1 can be terminated.
3. Continuing with the example, to stop connection 1 issue this command:
   `emadmin stop -k1`
   You will be prompted for the EMSRV user's password.

The client's connection to the repository server will be stopped. You can verify this by issuing the **emadmin list** command again.

NetWare **Stopping a client connection from the NetWare console**
From the EMSRV for NetWare menu, select **View Connections**. To display statistics for a particular client connection, select it from the list and press **Enter**. To terminate that connection, press **Delete**. Press **Esc** to return to the menu.

**RELATED CONCEPTS**
The repository server (EMSRV)
EMSRV user

**RELATED TASKS**
Displaying server connections
Stopping the repository server

**RELATED REFERENCES**
The EMADMIN utility - overview
The EMADMIN stop command
EMSRV and TCP/IP

## Stopping the repository server

**Warning**
To ensure developers have had a chance to save their work, do not stop EMSRV while team clients are still connected. To display active connections, issue the **emadmin list** command.

**Stopping EMSRV remotely**
You can stop EMSRV from any network-attached workstation that has the EMADMIN utility installed. To stop the repository server remotely, use the **emadmin stop** command:

`emadmin stop [-p password] [-h host]`

A message will inform you that the server has been scheduled to stop.

OS/2 If a password was used to start the server, you must provide the same password to stop it.

WIN AIX HP-UX Solaris NetWare The password is the EMSRV user's password. If you do not provide the `-p` parameter, you will be prompted for it. If the EMSRV user does not have a password, issue `emadmin stop -p` with no *password* argument.

AIX HP-UX Solaris If the operating system on the server uses shadow passwords, remote shutdown will fail unless EMSRV was started with the **emsrv.shadow** command.

### WIN Stopping EMSRV from the control panel

If EMSRV has been installed as a service in the NT registry, you can stop it from the Control Panel on the server:

1. Double-click **Services**.
2. Select **EMSRV** from the list of services.
3. Select **Stop**.

### NetWare Unloading EMSRV from the NetWare console

You can not unload EMSRV for NetWare using the **unload** command from the server console. You can use the EMADMIN utility as described above, or you can use the EMSRV for NetWare menu.

To stop from the menu, select **Shutdown EMSRV** and provide the EMSRV user's password when prompted.

**RELATED CONCEPTS**

The repository server (EMSRV)
EMSRV user

**RELATED TASKS**

Installing EMSRV as a service in the Windows NT registry
Displaying server connections
Stopping a client connection

**RELATED REFERENCES**

The EMADMIN utility - overview
The EMADMIN stop command
EMSRV startup parameters

## Displaying server connections

To display active connections to the repository server, for example when preparing to stop EMSRV, issue **emadmin list** from a command prompt. You can use the **-s** and **-l** parameters to display statistics and active locks for a particular connection.

EMSRV must be running on the server in order for you to communicate with it using the EMADMIN utility.

NetWare From the EMSRV for NetWare menu, select **View Connections**. To display statistics for a particular connection, select the connection from the list and press Enter. Press Esc to return to the menu.

**RELATED CONCEPTS**

The repository server (EMSRV)

**RELATED TASKS**

Displaying server statistics
Stopping a client connection

**RELATED REFERENCES**

The EMADMIN utility - overview
The EMADMIN list command

## Displaying server statistics

The **emadmin stat** command displays statistics for the repository server, covering the time period since EMSRV was last started. This provides information such as the following:

- Elapsed time since the repository server was started
- Number of connects and disconnects
- Reads, writes, and locks
- Packets sent and received
- The EMSRV working directory

EMSRV must be running on the server in order for you to communicate with it using the EMADMIN utility.

NetWare From the EMSRV for NetWare menu, select **EMSRV Statistics**. (If EMSRV Statistics has already been selected, select it again to force a screen update.) This will display statistics covering the time period since the EMSRV NLM was loaded. Press Esc to return to the menu.

**RELATED CONCEPTS**
The repository server (EMSRV)

**RELATED TASKS**
Displaying server connections
Changing the EMSRV working directory

**RELATED REFERENCES**
The EMADMIN utility - overview
The EMADMIN stat command

## Displaying active EMSRV settings

To display the options that are currently in effect for the repository server, issue the **emadmin opts** command from a command prompt. This will display information such as the following:

- The EMSRV working directory
- Whether password validation has been enabled
- What level of messages are being logged
- The name of the log file
- The maximum number of concurrent connections allowed
- The threshold for free disk space on the repository server

EMSRV must be started on the server in order for you to communicate with it using the EMADMIN utility.

NetWare From the Menu console, select **Change Settings**. A form will appear, showing you the current EMSRV settings.

**RELATED CONCEPTS**
The repository server (EMSRV)

**RELATED TASKS**
Changing EMSRV settings (NetWare)
Changing the EMSRV working directory

**RELATED REFERENCES**
The EMADMIN utility - overview
The EMADMIN opts command
EMSRV startup parameters

## Displaying EMSRV messages

When debugging an EMSRV problem, it is often useful to watch the messages that get written to the log or the server console, as they occur.

If you are not sure where EMSRV is currently logging, issue the **emadmin opts** command. This will tell you the name of the log file, whether logging to the server console is also enabled, and what the current logging level is.

NetWare To display messages logged by EMSRV, select **View Message Screen** from the EMSRV for NetWare menu. To return to the menu, press Esc.

**RELATED CONCEPTS**
The repository server (EMSRV)

**RELATED TASKS**
Setting EMSRV message logging options
**RELATED REFERENCES**
The EMADMIN utility - overview
The EMADMIN opts command
EMSRV startup parameters

## Changing the EMSRV working directory

The EMSRV working directory is the default directory that the repository server uses to locate shared repositories when, for example, a user is changing repositories or exporting to another repository. For ease of use, it is recommended that you store all shared repositories in the EMSRV working directory. This allows team members to find shared repositories without providing path information.

WIN If EMSRV is started as a service, the default EMSRV working directory is the Windows NT system32\ directory. It is recommended that you change this default by using the **-W** parameter when you install EMSRV as a service in the Windows NT registry.

WIN If EMSRV is started from a command prompt, the default EMSRV working directory is the directory where emsrv.exe is installed. To change the default, use the **-W** parameter of the **emsrv** command when starting the repository server.

OS/2 By default, the EMSRV working directory is the directory where emsrv.exe is installed. To change the default, use the **-W** parameter of the **emsrv** command when starting the repository server.

NetWare By default, the EMSRV working directory is SYS:\. To change the default, use the **-W** parameter of the **emsrv** command when starting the repository server.

**RELATED CONCEPTS**
The repository server (EMSRV)
**RELATED TASKS**
Installing EMSRV as a service in the Windows NT registry
Starting the repository server on Windows NT
Starting the repository server on OS/2
Starting the repository server on AIX, HP-UX, or Solaris
Starting the repository server on NetWare
**RELATED REFERENCES**
EMSRV startup parameters

## Setting the server disk threshold

EMSRV will write warnings in its log file when there is a minimum amount of free space left on the disk drive where the VisualAge for Java shared repositories reside. The default is to log a warning when there are fewer than 10,000 kilobytes of free space remaining.

To change the disk storage threshold on the server, use the **-b** *kilobytes* startup parameter for EMSRV.

**RELATED CONCEPTS**
The repository server (EMSRV)

**RELATED TASKS**
Starting the repository server on Windows NT
Starting the repository server on OS/2
Starting the repository server on AIX, HP-UX, or Solaris
Starting the repository server on NetWare
Displaying EMSRV messages

**RELATED REFERENCES**
EMSRV Startup Parameters

## Setting EMSRV message logging options

You can change where the repository server logs messages, and you can change the level of detail of the messages logged.

**Specifying where EMSRV logs messages**
By default, messages are logged to a file called emsrv.log in the EMSRV working directory. To specify a different log name, use the **-lf** parameter when starting EMSRV.

WIN OS/2 To log messages to the Command Prompt window from which EMSRV was started, use the **-lc** parameter when starting EMSRV. Messages will also be logged to the log file.

NetWare EMSRV for NetWare logs to the EMSRV message screen as well as to the log file.

AIX HP-UX Solaris To log messages to stdout instead of a log file, use the **-ls** parameter when starting EMSRV. If you do this, you must also use the **-f** parameter to run EMSRV in the foreground.

**Specifying EMSRV message logging levels**
You can set the message logging level when you start EMSRV, using the appropriate startup parameter:

- -s0 logs all operations
- -s1 logs warning and error messages ( AIX HP-UX Solaris default)
- -s2 logs only errors ( WIN OS/2 NetWare default)

For performance reasons, it is recommended that you use the default reporting level during normal operation. Log more detailed information only when you are trying to diagnose a problem.

You can also change the message logging level while the repository server is running, by issuing the **emadmin opts** command with the **-s** parameter. You will be prompted for the EMSRV user's password.

NetWare Use the EMSRV for NetWare menu to select **Change Settings**. A form will appear, allowing you to view and change the current EMSRV settings, including logging level. Once you have made your changes, press Esc to save them.

**Verifying the EMSRV message logging level**
To confirm which level of messages are currently being logged, issue the **emadmin opts** command.

**RELATED CONCEPTS**
The repository server (EMSRV)
EMSRV user

**RELATED TASKS**
Starting the repository server on Windows NT
Starting the repository server on OS/2
Starting the repository server on AIX, HP-UX, or Solaris
Starting the repository server on NetWare
Displaying EMSRV messages
Changing the EMSRV working directory

**RELATED REFERENCES**
The EMADMIN utility - overview
The EMADMIN opts command
EMSRV startup parameters

## Changing EMSRV settings (NetWare)

You can change the following settings for EMSRV while it is running:

- Logging level and log file name
- Whether repositories can be truncated
- Whether password validation is in effect
- How often EMSRV should refresh its statistics screen

The available choices for these settings are the same as the EMSRV startup parameters. To change any of these settings:

1. From the EMSRV for NetWare menu on the server, select **Change Settings**. A form will appear.
2. Use the Arrow keys to highlight the setting that you want to change. Make your change and press Enter. The setting will be changed.

3. Press Esc to return to the menu.

Changes made from the menu are only in effect until EMSRV is stopped. The next time you start the repository server, you can specify the same settings (and many others) using startup parameters of the **load emsrv** command.

**RELATED CONCEPTS**
The repository server (EMSRV)

**RELATED TASKS**
Setting EMSRV message logging options
Enabling password validation - overview
Starting the repository server on NetWare

**RELATED REFERENCES**
EMSRV startup parameters

## Adding users to the repository user list

The administrator maintains the list of team members who can access each shared repository.

If you plan to enable password validation with VisualAge for Java, then team members also require either user accounts on the server, or entries in the passwd.dat file.

**Adding a user to the repository list**
To add a user to the repository list:

1. Change the workspace owner to Administrator.
2. From any **Window** menu, select **Repository Explorer**.
3. From the **Admin** menu, select **Users**. The User Administration dialog box will appear. The left pane lists the users who are currently in the repository list.
4. Click **New**.
5. Enter a unique name, full name, and network login name. Click **Save**. The user list on the left will be updated with the new user.

**Changing a user on the repository list**
You can change the Full Name or Network Login Name for a user on the list. To change a user on the repository list:

1. Open the User Administration dialog box, as described above.
2. Select the user to be updated.
3. Modify the Full Name or Network Login Name.
4. Click **Save.**The information for that user will be changed.

**Deleting a user from the repository list**
Before deleting a user, ensure the user does not own any program elements associated with this repository. To delete a user from the repository list:

1. Open the User Administration dialog box, as described above.
2. Select the user to be deleted.
3. Click **Delete**. The user list on the left will no longer show the user.

**RELATED CONCEPTS**
Repository
Repository administrator
Repository user list

**RELATED TASKS**
Changing workspace owner
Adding members to a package group
Changing a program element's owner
Enabling password validation - overview

## Enabling password validation - overview

When password validation is enabled, team members must provide valid passwords to do these tasks:

- Connect to a repository managed by that server.
- Change workspace owner.

By default, the VisualAge for Java repository server runs run with *no* password validation. You have two other options:

- Use native operating system accounts and passwords (available on all server operating systems except OS/2).
- Use a VisualAge for Java password file to verify user names and passwords (available on all server operating systems).

Refer to the Related Tasks for details on enabling either password option.

**RELATED CONCEPTS**
The repository server (EMSRV)

**RELATED TASKS**
Enabling native password validation
Enabling password validation with the passwd.dat file
Starting the repository server on Windows NT
Starting the repository server on OS/2
Starting the repository server on AIX, HP-UX, or Solaris
Starting the repository server on NetWare

**RELATED REFERENCES**
EMSRV startup parameters

## Enabling native password validation

OS/2 Native password validation is not available on OS/2.

You can use native operating system accounts to enforce password validation when team members connect to a shared repository. To enable native password validation:

1. Create an account for each user on the server, following standard procedures for your operating system.
2. Test the new user accounts by logging in to the operating system itself.
3. Add the new users to the VisualAge for Java repository user list. In the User Administration dialog box, provide the operating system account as the **Network Login Name** for each user.

4. WIN Include the **-rn** startup parameter when you start EMSRV. You can set your own default EMSRV startup parameters, including **-rn**, by installing EMSRV as a service in the Windows NT registry.

   NetWare Include the **-rn** startup parameter when you start EMSRV. In a Novell Directory Services (NDS) environment, you should also use the **-SC** startup parameter of the **emsrv** command to set an NDS context for the network login names that were provided when the users were added to the VisualAge for Java repository user list. If the **-SC** parameter is not specified, the NDS context will be root.

   AIX HP-UX Solaris If the server operating system uses shadow passwords, start the server by issuing the **emsrv.shadow** command with the **-v** startup parameter. The process must be started by root. The emsrv.shadow process will then have root authority, which means VisualAge for Java clients can save repository (.dat) files anywhere when they export from the IDE.

   AIX HP-UX Solaris If the server operating system does *not* use shadow passwords, start the server by issuing the **emsrv** command with the **-v** startup parameter. The process may be started by root, or root can make another user the owner of the emsrv binary and then set the uid bit, as in the following example:

   ```
   chown matilda emsrv
   chmod u+xs emsrv
   ```

   In the above example, matilda, who will be the EMSRV user, can enable native password validation by starting the server with the **-v** parameter.

Users will be prompted for their system password when they connect to a shared repository on the server or when they change workspace owner.

**RELATED CONCEPTS**
Team client/server configuration
The repository server (EMSRV)
Server security

**RELATED TASKS**
Enabling password validation - overview
Adding users to the repository user list
Starting the repository server on Windows NT
Starting the repository server on OS/2
Starting the repository server on AIX, HP-UX, or Solaris
Starting the repository server on NetWare
Enabling password validation with the passwd.dat file
Installing EMSRV as a service in the Windows NT registry

**RELATED REFERENCES**
EMSRV startup parameters

## Enabling password validation with the passwd.dat file

As an alternative to using native operating system passwords, the repository administrator can maintain a file of VisualAge for Java users and passwords. This file is called passwd.dat. If the appropriate EMSRV startup parameter for password checking is used, this file will be checked whenever a team member connects to a shared repository on the server.

**The passwd.dat file**
The passwd.dat file resides in the EMSRV working directory. There is one passwd.dat file per server; that file is used for all shared repositories on the same server. The passwd.dat file contains one entry per team member, with one user name and password per entry. The user name is first, separated from the password by a single space. Here is an example:

```
fred mypassword
barney secret
wilma hello
betty ZXF65
```

See the instructions below for more information on the user name.

The passwd.dat file is *not* encrypted. Passwords should *not* be the users' network login passwords. You may wish to restrict file access to just the EMSRV user and the team administrator who maintains the file.

**Enabling VisualAge for Java password checking**
To use the passwd.dat file for password validation, do the following steps:

1. Create an entry for each user in the passwd.dat file on that server.
2. Add each user to the repository user list, providing their name from the passwd.dat file as the **Network Login Name** in the User Administration dialog box.
3. WIN OS/2 NetWare When you start the repository server, use the **-rp** startup parameter of the **emsrv** command.
   AIX HP-UX Solaris When you start the repository server, use the **-r** startup parameter of the **emsrv** command.

Users will be prompted for their system password when they connect to a shared repository on the server or when they change workspace owner.

WIN You can set your own default EMSRV startup parameters, including **-rp**, by installing EMSRV as a service in the Windows NT registry.

**RELATED CONCEPTS**
Team client/server configuration
The repository server (EMSRV)
Repository administrator
EMSRV user

**RELATED TASKS**
Adding users to the repository user list
Enabling native password validation
Installing EMSRV as a service in the Windows NT registry
Changing the EMSRV working directory

**RELATED REFERENCES**
EMSRV startup parameters

## Providing a standard workspace

In the team development environment, you may wish to provide a standard workspace at the beginning of a project, to ensure that team members start with the same editions of the same program elements. You can do this by copying the workspace file, ide.icx.

The following procedure is an example of how you can copy the workspace from one client (the source) to another (the target).

1. On the source client, connect to the shared repository.
2. Add the desired projects and packages from the repository to the workspace, and delete projects and packages that are not desired. The result is your standard workspace. See the comments about password validation, below.
3. Exit the IDE. The workspace is saved as the ide.icx file on the source client's workstation. The server and repository names are saved in the client's ide.ini file.
4. Using file system commands, copy the source client's ide.icx and ide.ini files. For example, you might call the copies team1.icx and team1.ini. You may wish to store these on the server, in a directory to which the team has read-only access.
5. On the target client workstation, preserve the existing ide.icx and ide.ini files by renaming them, for example to icx.old and ini.old.
6. Copy team1.icx and team1.ini into the target client's VisualAge for Java program directory, naming them ide.icx and ide.ini.
7. Start the IDE on the target client. The workspace will connect to the shared repository and will contain the desired projects and package editions. By default, the workspace will be owned by the user who created the standard workspace.
8. Change the workspace owner.

In an environment where password validation is enabled for VisualAge for Java, to start the IDE on the target workstation you must provide the password of the user who owned the standard workspace when it was saved. To handle this situation, the administrator could create a dummy user who owns the standard workspace but has no other privileges, and team members could first start the IDE with the dummy user's password and then change workspace owner.

**RELATED CONCEPTS**
Team client/server configuration
Workspace
Repository

**RELATED TASKS**
Saving the workspace
Changing workspace owner
Adding users to the repository user list
Enabling password validation - overview
Connecting to a dhared repository
Adding classes and methods from the repository to the workspace
Adding projects and packages from the repository to the workspace
Setting IDE options

**RELATED REFERENCES**
Important files to back up

## Creating a repository

When you first install VisualAge for Java on the team server, one shared repository is provided. By default, this file is called ivj.dat. You can create additional repositories, for separate the source code for two completely distinct groups of developers.

When you are creating a new repository, you may wish to adhere to the 8.3 file naming convention. This ensures that the repository can be used on any EMSRV server. Repository files normally have .dat as the file extension.

**Creating a new repository by copying an existing one**
You can create a new repository by copying an existing repository. For example, you might copy the original ivj.dat repository as a basis for every new repository. Give each copy a different name, such as team1.dat and team2.dat. The new repository will be exactly the same size as the copied repository, and will have the same repository user list.

For details, see the related topic on backing up a shared repository.

**Create a new repository by exporting**
You can also create a repository by exporting from one repository (the source) to another repository that does not exist yet (the target). The new repository will only contain the projects and packages that you choose to export, so it will be smaller than the original repository. It will contain all editions of the exported projects and packages. The new repository's user list will include the following users:

- All owners of exported projects, packages, and classes
- Developers of exported classes
- Members of package groups for exported packages

Remember to export the base libraries on which your classes depend. There are four base projects:

- IBM Java Implementation
- Java class libraries
- JFC class libraries
- Sun class libraries

If you forget to include some program elements, you can export them into the same target repository later.

**Creating a new repository by compacting**
Finally, you can create a new repository by compacting an existing repository. Compacting copies all program elements from the source repository, but it *only* copies versioned projects, versioned packages, and versioned classes that are contained in versioned packages. Otherwise, this approach is similar to exporting.

**RELATED CONCEPTS**
Repository
Repository user list
Ownership and team roles - overview

**RELATED TASKS**
Dividing a repository
Backing up the repository
Backing up a shared repository
Exporting to another repository
Compacting a repository
Adding users to the repository user list
Connecting to a shared repository

**RELATED REFERENCES**
Repository files
The EMADMIN utility - overview
The EMADMIN copy command

## Backing up a shared repository

**Overview**
The procedures described below are for backing up and restoring a shared repository on a team server. If you wish to back up a local repository on a VisualAge for Java client, see the links to related information at the end of this document.

The shared repository is where all of the team's work is saved. The administrator should back up the repository every day. There two basic alternatives:

- Use the **emadmin copy** command, without stopping the repository server (EMSRV). This command locks the source repository to ensure that no one changes it while it is being copied. **Emadmin copy** creates a new repository on the same server or on another server that is also running EMSRV.
- Use operating system commands or a backup utility to copy the repository file, perhaps to offline media. If you take this approach, you are responsible for ensuring that no one can change the repository while it is being backed up.

It is recommended that you back up resource files, such as images or sound files, at the same time as the source repository. This is easiest to coordinate if team developers use a shared resource directory, as described elsewhere in this documentation.

**Backing up with the Emadmin copy command**
The **emadmin copy** command locks the repository while it is being copied. Team developers should not be browsing or saving code when the administrator starts the backup.

1. To check the last request time (LRT) of any clients that are still connected, issue the **emadmin list** command.
2. Issue the **emadmin copy** command to copy the repository to another .dat file. The following example copies team1.dat from the EMSRV working directory, to a file called bkup.dat in another directory:

   ```
   emadmin copy team1.dat j:\backups\bkup.dat
   ```
3. Use operating system commands to back up the shared resource directory.

For more information on **emadmin copy** and its parameters, see the related links that are listed below.

**Backing up without the Emadmin copy command**
If you prefer to use operating system commands or a server backup utility, then you must ensure that no changes can be written to the repository file while it is being copied. Your operating system or backup utility may provide file locking support. If not, you should disconnect VisualAge for Java clients during the backup, as described in the following example.

1. Ask users to exit the IDE.
2. To ensure that no clients are connected, issue the **emadmin list** command.
3. To prevent clients from reconnecting to the repository while you are backing it up, issue the **emadmin stop** command. This stops EMSRV.

4. Use operating system commands or a backup utility to copy the repository files (.dat files) and any resource files that reside on the server.
5. Issue the **emsrv** command to restart the repository server.

**Restoring a repository**
Here is an example of a procedure for restoring a repository:

1. To check that no clients are connected to the repository that you are about to replace, issue the **emadmin list** command.
2. To prevent clients from connecting to the repository while it is being restored, stop EMSRV.
3. Rename the repository (.dat file) that you are about to replace. For example, rename team.dat to obsolete.dat.
4. Use operating system commands to copy the backup version of the file into the EMSRV working directory, giving it the original name, for example team.dat.
5. Restart the repository server and tell the team they can reconnect to the shared repository.

**RELATED CONCEPTS**
Repository
Repository administrator
The repository server (EMSRV)
EMSRV user

**RELATED TASKS**
Displaying server connections
Backing up a local repository
Sharing resource files
Stopping the repository server
Connecting to a shared repository
Changing repositories
Starting the repository server on Windows NT
Starting the repository server on OS/2
Starting the repository server on AIX, HP-UX, or Solaris
Starting the repository server on Windows NT
Changing the EMSRV working directory

**RELATED REFERENCES**
Repository files
The EMADMIN utility - overview
The EMADMIN copy command
The EMADMIN stop command
EMSRV startup parameters
Important files to back up

## Compacting a repository

Compacting reduces the size of the repository by eliminating the following program elements:

- All open editions
- All purged editions
- Versioned editions of classes that are contained in open editions of packages

The compacted repository, which contains only versioned editions, can be as much as 50% smaller than the original.

The procedure for compacting a repository depends on which edition of VisualAge for Java you use. If you use “VisualAge for Java, Enterprise Edition (page 94),” skip to the instructions that follow.

**Compacting the repository in VisualAge for Java, Professional Edition**
In VisualAge for Java, Professional Edition, compacting replaces the existing repository with a smaller repository. To compact the repository:

1. As a precaution, back up the repository (ivj.dat file) before compacting it.
2. Version the open editions of projects, packages, and classes that you wish to keep.
3. Purge any projects and packages that you wish to discard, (To minimize the size of the new repository, purge obsolete *package* editions. Purging an edition of a project removes information about the project but does not purge any of the program elements that it contains.)
4. Open the Repository Explorer window.
5. Select **Compact Repository** from the **Admin** menu. You will be asked to confirm that you wish to replace the repository.
6. Click **Yes** to proceed.

When the repository has been compacted, it will contain only versioned editions of projects and packages, and versioned editions of program elements that they contain.

**Compacting a repository in VisualAge for Java, Enterprise Edition**
In VisualAge for Java, Enterprise Edition, compacting copies from the existing (source) repository to another (target) repository.

You must be the administrator to compact a repository.

1. Ask team members to purge any versioned editions that they wish to discard, and to version any open editions that they wish to keep. (To minimize the size of the new repository, purge obsolete *package* editions. Purging an edition of a project removes information about the project but does not purge its contained packages, classes, or methods.)
2. Connect to the source repository.
3. Open the Repository Explorer window.
4. Select **Compact Repository** from the **Admin** menu. You will be asked to confirm that you wish to compact the repository.
5. Click **Yes** to continue. A dialog box will appear, asking you to select a new or existing repository to compact into.
6. Select **Use shared repository** and accept the IP address or host name of the server where the target repository will reside. If you are creating a new repository, enter its name in the **Repository name** field; if you are compacting into an existing repository click **Browse** and select it from the list of repositories on that server. (You may wish to compact into an existing target repository, if someone omitted to version necessary program elements before a previous attempt to compact the source repository.)
7. Click **OK** to proceed with compacting the repository. Versioned projects and packages, along with the versioned editions of their contained program elements, will be copied to the target repository.
8. Once you have a new repository that contains all program elements required by the team, instruct all developers to change to the new repository. To check whether anyone is still using the old one, issue the **emadmin list** command.

Keep the old repository on the server for a few days, in case team members need to reconnect to it in order to export additional program elements.

**RELATED CONCEPTS**
Repository
Repository administrator
**RELATED TASKS**
Versioning a program element
Purging program elements from the repository
Backing up the repository
Backing up a shared repository
Connecting to a shared repository
Changing repositories
Viewing information about your repository connection
**RELATED REFERENCES**
Repository files
The EMADMIN utility - overview

## Dividing a repository

As your team grows, you may decide to divide the shared repository into two or more repositories, based on team responsibilities. Here is an example of how you could divide a repository called team1.dat:

1. Back up the existing repository, as a precaution.
2. Copy the existing repository, team1.dat, to team2.dat.
3. Purge program elements from both repositories, based on each team's requirements.
4. Tell the members of the second team to change repositories to team2.dat.
5. After some period of time - perhaps two weeks - compact both repositories to permanently delete the purged items and reclaim disk space.

If the new repository is on the same server, no user administration is required. If the new repository is on a different server, then the administrator for that server will have to add the developers of team2.dat to the repository user list.

**RELATED CONCEPTS**
Repository

**RELATED TASKS**
Backing up a shared repository
Purging program elements from the repository
Changing repositories
Compacting a repository
Adding users to the repository user list
Creating a repository
Exporting to another repository
**RELATED REFERENCES**
Repository files

## EMSRV restrictions

This document addresses the following subjects:

- Supported operating systems for EMSRV (page 96)
- EMSRV for NetWare (Bindery) and EMSRV for NetWare (NDS) (page 96)
- Interoperability with other versions of EMSRV (page 96)
- Location of shared repositories (page 96)

**Supported operating systems for EMSRV**
The following operating systems are supported as VisualAge for Java *servers*:

- Windows NT Workstation Version 4.0
- Windows NT Server Version 4.0
- OS/2 Warp Version 4.0
- OS/2 Warp Server 4.0
- AIX Version 4.2.1
- HP-UX Version 10.20
- Sun Solaris Version 2.6
- Novell NetWare Versions 3.12, 4.1, and 4.11
- Novell intraNetWare Version 4.11

**EMSRV for NetWare (Bindery) and EMSRV for NetWare (NDS)**
VisualAge for Java provides two different NLMs for Novell servers. There are two functional differences between EMSRV for Netware (NDS) and EMSRV for NetWare (Bindery):

- How they log in to the server
- How they handle password validation, if you choose to enable native password validation for the VisualAge for Java repository server

EMSRV for NetWare (NDS) has the following considerations:

- Is recommended for all VisualAge for Java repository servers running on NetWare 4.1 and 4.11
- Takes advantage of Novell Directory Services
- Is not supported on NetWare 3.12
- Runs on NetWare 4.1 and 4.11, irrespective of whether bindery emulation mode is enabled

EMSRV for NetWare (Bindery) has the following considerations:

- Runs on NetWare 3.12
- Is supported on NetWare 4.1 and 4.11 if bindery emulation mode is enabled

**Interoperability with other versions of EMSRV**
VisualAge for Java includes Version 6.23 of the EMSRV repository server. It is not recommended that you attempt to interoperate with older EMSRV servers, for instance from VisualAge Smalltalk or VisualAge Generator.

The EMADMIN utility provided with VisualAge for Java is not compatible with versions of EMSRV earlier than 6.0, and the old EMSRV utility set is not compatible with EMSRV 6.1 or higher.

**Location of shared repositories**
The repository server (EMSRV) can only manage VisualAge for Java repositories (.dat files) that are local to that server. EMSRV must be installed and started on every system where a shared repository resides.

**RELATED CONCEPTS**
The repository server (EMSRV)
**RELATED TASKS**
Enabling password validation - overview
Starting the repository server on NetWare
**RELATED REFERENCES**
EMSRV startup parameters
Repository files

## EMSRV startup parameters

The following table lists and describes parameters you can use when starting the VisualAge for Java repository server. All parameters are case-sensitive.

| Parameter | Server operating system | Description |
|---|---|---|
| - A *0, 1* | All | The file system requires read locks. The default setting is 0 which indicates the file system does not require read locks. |
| -a *seconds* | AIX, HP-UX, Solaris | Sets the number of seconds before a connection is deemed inactive. The default is 360 seconds. |
| -b *Kilobytes* | All | Sets the low-volume threshold warning in kilobytes. The default is 10,000 kilobytes. If the available disk space is less than the low-volume threshold, EMSRV will log warning messages to the log file. |
| -f | AIX, HP-UX, Solaris | Sets emsrv to run in the foreground. |
| -h | All | Displays the help text that lists the valid parameters. |
| -i *q,t* | AIX, HP-UX, Solaris | Ignores signals. *q* = ignore SIGQUIT; *t* = ignore SIGTERM. |
| -install | WinNT | Installs EMSRV as a service in the Windows NT registry. |
| -lc | All | Logs messages to the server console. By default, messages are not written to the console. (See also -lf.) |

| | | |
|---|---|---|
| -lf *name* | All | Writes the log to file *name*. On AIX, HP-UX, and Solaris, do not leave a space between the **-lf** parameter and the name variable.<br><br>By default, the log is written to emsrv.log. The file *name* must specify a valid path for which the EMSRV user has sufficient rights. (See also -lc.) |
| -lp *seconds* | AIX, HP-UX, Solaris | Sets the maximum number of seconds to wait for a lock. The default is 15 seconds. |
| -ls | AIX, HP-UX, Solaris | Logs messages to stdout instead of a log file. You must also use -f parameter if -ls is used. |
| -lt *seconds* | AIX, HP-UX, Solaris | Sets the maximum number of seconds to hold a lock. |
| -M *numberOf Connections* | All | Specifies the maximum number of connections that can be established to EMSRV. The default is 256, but some TCP/IP stacks will run out of stream sockets before this limit is reached. |
| -n | AIX, HP-UX, Solaris | Turns off statistics gathering. |
| -P *port Number* | All | Specifies the port number that EMSRV uses. The default is 4800. |
| -p *password* | WinNT, NetWare, OS/2 | Provides the password for the EMSRV user. The same password is required for certain EMADMIN functions such as shutting down the repository server remotely. (See also: -u.)<br><br>For NetWare and Windows NT you must specify -p without the *password* argument, if the EMSRV user has no password. |
| -R *0,1* | All | The file system releases locks on file close. The default setting is 1 which indicates the file system releases locks when a file is closed. |
| -r | AIX, HP-UX, Solaris | Rejects users who are not in the passwd.dat file. |
| -rd | WinNT, OS/2 | Disables password checking for clients. This is the default setting. |
| -remove | WinNT | Removes the EMSRV service from the registry. |

| | | |
|---|---|---|
| -rn | WinNT, NetWare | Rejects users who do not supply a user name and password recognized by the server operating system. By default, no password is required to connect to the shared repository. |
| -rp | WinNT, NetWare, OS/2 | Rejects users who are not in the passwd.dat file. By default, no password is required to connect to the shared repository. |
| -s *0, 1, 2* | All | Sets the reporting level to the specified severity level:<br>• -s0 logs all operations<br>• -s1 logs warning and error messages (default for AIX, HP-UX, and Solaris servers)<br>• -s2 logs only errors (default for Windows NT, OS/2, and NetWare servers) |
| -SC *context* | NetWare (NDS) | Sets the default EMSRV for NetWare (NDS), NetWare Loadable Module (NLM), Novell Directory Services (NDS) context.<br><br>See also -rn.<br>Not applicable for EMSRV for NetWare (Bindery). |
| -t | All | Protects existing files from truncation. By default, files are created over existing ones; that is, the existing file is truncated to 0 length. |
| -u *username* | WinNT, NetWare | Specifies the EMSRV user. (See also: -p.) |
| -v | AIX, HP-UX, Solaris | Verifies password using system authorization. |
| -W *path* | WinNT, NetWare, OS/2 | Specifies the EMSRV working directory. The *path* must be a valid path for which the EMSRV user has sufficient rights to read and write. |
| -w | All | Specifies that EMSRV should track locks for each connection. |
| -xn | AIX, HP-UX, Solaris | Allows databases to be opened on non-native devices. |
| -xd | AIX, HP-UX, Solaris | Specifies valid devices for the database. |

**RELATED CONCEPTS**
The repository server (EMSRV)
EMSRV user

**RELATED TASKS**
Setting up a team server - overview
Installing EMSRV as a service in the Windows NT Registry
Starting the repository server on Windows NT
Starting the repository server on OS/2
Starting the repository server on AIX, HP-UX, or Solaris
Starting the repository server on NetWare
Changing the EMSRV working directory

**RELATED REFERENCES**
The EMADMIN utility - overview

## EMSRV and TCP/IP

TCP/IP is the only supported network protocol for the VisualAge for Java team development environment.

By default, EMSRV uses port 4800. To change this, use the **-P** parameter when issuing the **emsrv** command to start the repository server.

The default limit for client connections to a server is 256. This limit can be changed by using the **-M** parameter of the **emsrv** command. Some TCP/IP stacks will run out of stream sockets before this limit is reached.

VisualAge for Java client/server connections use the TCP keep-alive timer. Some TCP/IP stacks allow the keep-alive timer to be changed. Typically it is 120 minutes. After this time has elapsed, the EMSRV TCP stack sends a keep-alive packet. If the client does not reply, the connection on the server and all its resources are cleaned up.

**RELATED CONCEPTS**
Team client/server configuration
The repository server (EMSRV)
**RELATED REFERENCES**
EMSRV startup parameters

## The EMADMIN utility - overview

The EMADMIN command-line utility allows you to manage a repository server (EMSRV) from any network-attached workstation where emadmin.exe is installed.

The following table summarizes the EMADMIN commands that are available. Each of these commands is discussed as a separate topic in this reference. To display a list of these commands and their most common parameters, issue the **emadmin** command with no parameters.

| Command | Description |
|---|---|
| **bench** | Runs bench tests between the client TCP stack and the server TCP stack. The tests determine any performance problems. |

| | |
|---|---|
| **copy** | Copies a VisualAge for Java repository on the server. |
| **list** | Displays the current EMSRV connection list or information about a specific connection. |
| **opts** | Displays the current EMSRV settings. |
| **stat** | Displays EMSRV statistics. |
| **stop** | Shuts down EMSRV remotely or closes an active connection. |

**Supported Operating Systems**
EMADMIN is supported on the following operating systems:

- Windows 95
- Windows NT Workstation 4.0
- Windows NT Server 4.0
- OS/2 Warp 4.0
- AIX 4.2.1
- Sun Solaris 2.6
- HP-UX 10.20

**Syntax**
EMADMIN uses the following syntax:

```
emadmin command [parameter1] [parameter2]...
```

**RELATED CONCEPTS**
The repository server (EMSRV)
EMSRV user

**RELATED REFERENCES**
The EMADMIN bench command
The EMADMIN copy command
The EMADMIN list command
The EMADMIN opts command
The EMADMIN stat command
The EMADMIN stop command

## The EMADMIN bench command

The **emadmin bench** command is used to do problem determination, when there are suspected performance problems between the TCP stacks on the clients and server. It is normally run at the request of IBM's technical support organization, who would normally ask you to submit the log files to them for analysis.

The **emadmin bench** command runs a series of read tests on a temporary source repository to determine the performance for different client buffer sizes. The test takes approximately 1 to 5 minutes. You should delete the temporary source repository after the test has been completed.

**Syntax**

```
emadmin bench [-t test repository] [-l logfile] [-s size] [-P portNumber]
```

| Parameter | Description |
|---|---|

| | |
|---|---|
| -t | Specifies the name of the temporary repository file to create. The default name is testlib.dat. |
| -l | Specifies the name of the log file to write. The default name is embench.log. If the log file exists, it is overwritten. |
| -s | Specifies the size of the benchmark sweep. |
| -P | Specifies the port that EMSRV is using. The default port number is 4800. |

**Example**

```
emadmin bench myserver.com.us -t test1.dat
```

This example creates the test repository test1.dat and runs the bench test, logging to the default log file embench.log.

**RELATED CONCEPTS**
The repository server (EMSRV)
EMSRV user

**RELATED TASKS**
Creating a repository

**RELATED REFERENCES**
The EMADMIN utility - overview

## The EMADMIN copy command

The **emadmin copy** command allows you to copy a VisualAge for Java repository (the source) to another repository (the target). The target repository may be on the same server, or on another server in the network. The **emadmin copy** command locks the source repository to make sure it is not changed during the copy operation.

**Restrictions**

- EMSRV must be running on the source and target servers.
- You must know the EMSRV user's password.
- The source and target repositories must reside in directories to which the EMSRV user has access. They can not reside on remote file systems.
- While the repository is being copied, team developers should not be browsing, saving code, or running scripts that lock the library. The administrator can use the **emadmin list** command to see whether clients are still connected, or to see the the last request time (LRT) of clients that are still connected.

**Syntax**

```
emadmin copy source target -p password [-o] [-q] [-P portNumber]
```

| Parameter | Description |
|---|---|

| | |
|---|---|
| *source* | The VisualAge for Java repository file that you want to copy. The file specification has the following format:<br><br>[*ip_address*]:*[path]filename*<br><br>*ip_address* is optional; it is the host name or IP address of the server where EMSRV is running. |
| *target* | The name of the repository to which you are copying. The format is the same as for the source file.<br><br>If the repository does not exist, it will be created. If it does exist, you will be prompted to confirm that you want to overwrite it.<br><br>The file specification has the same format as the source repository. |
| -o | Specifies that the target file may be overwritten without prompting. |
| -p | The password of the EMSRV user (the user who started EMSRV) on the source server. |
| -q | Specifies quiet operation so that EMADMIN will not issue any prompts or write the number of bytes transferred to the console. |
| -P | Specifies the port that EMSRV is using. The default port number is 4800. |

**Example**

To copy a repository file to a backup file, issue the following command:

```
emadmin copy team1.dat bkup.dat -o -p emsrvpw
```

In this example, the team1.dat repository will be copied to the bkup.dat repository, overwriting bkup.dat if it exists. Both repositories are in the EMSRV working directory on the same server, so no server or directory information needs to be provided. The EMSRV user's password is emsrvpw.

**RELATED CONCEPTS**

The repository server (EMSRV)
EMSRV user

**RELATED TASKS**

Backing up a shared repository
Creating a repository
Changing the EMSRV working directory

**RELATED REFERENCES**

The EMADMIN utility - overview

## The EMADMIN list command

The **emadmin list** command shows current connections to the repository server. You can use it to obtain information about connection statistics and active locks.

**Syntax**`emadmin list` *host* `[-s` *connectionNumber*`] [-l] [-P` *portNumber*`]`

| Parameter | Description |
|---|---|
| *host* | The host name or IP address of the server whose active connections you want to display. By default, this is the name of the host from which you are issuing the **emadmin** command. |
| -s | Display the statistics for the connection specified by connection number. |
| -l | Display the active locks for the connection specified by connection number. |
| -P | Specifies the port that EMSRV is using. The default port number is 4800. |

**Example 1**

Here is an example of the information that might be displayed in response to issuing `emadmin list teamserv` from a command prompt:

```
EMSRV Connection list for: teamserv
                    Active  Last
 ID IP Address      Locks   Request  Repository
-------------------------------------------
  0 9.55.55.155     0      18:18:27  ivj.dat
  1 9.55.55.156     0      18:38:14  another.dat
-------------------------------------------
```

Example 2

Here is an example of the information that might be displayed, in response to issuing `emadmin list 9.12.13.14 -s 0` from a command prompt:

```
EMADMIN 6.23
Copyright (C) IBM Corporation 1989-1998
Server Type : EMSRV
Server Version : EMSRV 6.23 for Windows NT Apr  4 1999 15:36:56 (AEST)
-------------------------------------------
Connection 0 statistics (9.21.13.14)
Repository: ivj.dat
Total Opens:                  2  Total Closes:              1
Total Reads:                  6  Total Writes:              0
Total Locks:                  0  Total Unlocks:             0
Current Locks:                0
-------------------------------------------
```

**RELATED CONCEPTS**

The repository server (EMSRV)

**RELATED TASKS**

Displaying server connections

**RELATED REFERENCES**

The EMADMIN utility - overview

## The EMADMIN opts command

The **emadmin opts** command allows you to do the following tasks:

- Display the parameters that were used to start the repository server
- Change the logging level for the EMSRV log, without restarting EMSRV

### Syntax

`emadmin opts host [-s level] [-P portNumber]`

| Parameter | Description |
|---|---|
| *host* | The host name or IP address of the server whose active connections you want to display. By default, this is the name of the host from which you are issuing the **emadmin** command. |
| -s *level* | Specifies a new logging level for EMSRV. You can specify the following logging levels:<br><br>**0** Logs all operations and messages to the log file.<br>**1** Logs warnings and errors to the log file.<br>**2** Logs only errors to the log file (default). |
| -P | Specifies the port that EMSRV is using. The default port number is 4800. |

### Example

Here is an example of the information that might be displayed in response to issuing `emadmin opts javateam` from a command prompt:

```
EMADMIN 6.23
Copyright (C) IBM Corporation 1989-1998
Server Type : EMSRV
Server Version : EMSRV 6.23 for Windows NT Apr  4 1998 15:36:56 (AEST)
================================================================================
EMSRV Options for: javateam
--------------------------------------
EMSRV 6.23 for Windows NT Apr  4 1998 15:36:56 (AEST) Options
Maximum number of concurrent connections = [256]
Working directory = [g:\emsrv623]
Password checking = [Disabled]
Logging level = [Error]
Log file name = [emsrv.log]
Allow connection to truncate libraries = [true]
Track EMSRV statistics = [true]
Track process file locking statistics = [false]
Process activity timeout value = [360] sec.
Sleep on lock value = [1000] msec.
Free disk space warning threshold = [10000] KBytes
Restrict libraries to local filesystems = [false]
--------------------------------------
```

**RELATED CONCEPTS**

The repository server (EMSRV)

**RELATED TASKS**

Changing EMSRV settings (NetWare)

**RELATED REFERENCES**
The EMADMIN utility - overview
EMSRV startup parameters

## The EMADMIN stat command

The **emadmin stat** command provides statistics for operations completed since the repository server was started. It also tells you what the current EMSRV working directory is.

### Syntax

`emadmin stat host [-P portNumber]`

| Parameter | Description |
|---|---|
| *host* | The host name or IP address of the server whose active connections you want to display. By default, this is the name of the host from which you are issuing the **emadmin** command. |
| -P | Specifies the port that EMSRV is using. The default port number is 4800. |

### Example

Here is an example of the information that might be displayed in response to issuing `emadmin stat teamserv` from a command prompt:

```
EMADMIN 6.23
Copyright (C) IBM Corporation 1989-1998
Server Type     : EMSRV
Server Version  : EMSRV 6.23 for Windows NT Apr 4 1998 15:36:56 (AEST)
================================================================================
EMSRV Statistics for: teamserv
--------------------------------------
EMSRV 6.23 for Windows NT Apr 4 1998 15:36:56 (AEST)
Total Connects:              27   Total Disconnects:             24
Total Opens:                  9   Total Closes:                   7
Active Locks                  0   Unexpected Connection Closes:   0
Total Locks:                  0   Total Unlocks:                  0
Total Reads:                 44   Total Writes:                   0
Total Reads Failed On Lock:   0   Total Locks Failed On Lock:     0
Times Lock Limit Hit:         0
Total Requests Serviced:    282   Requests in last interval:      0
Largest Packet Sent:       6836   Largest Packet Received:       24
Server Has Been Alive For: 0 Days 19 Hours 53 Minutes 31 Seconds
Server Working Directory : g:\teamreps
--------------------------------------
```

**RELATED CONCEPTS**
The repository server (EMSRV)
**RELATED TASKS**
Stopping the repository server
Stopping a client connection
Changing the EMSRV working directory
**RELATED REFERENCES**
The EMADMIN utility - overview

## The EMADMIN stop command

The **emadmin stop**command allows you to do the following tasks:

- Stop a client's connection to the repository server
- Stop EMSRV

### Syntax

`emadmin stop host [-k connection_number] [-p password] [-P portNumber]`

| Parameter | Description |
|---|---|
| *host* | The host name or IP address of the server. By default, this is the name of the host from which you are issuing the **emadmin** command. If you do not use -k to specify a particular connection, the entire server will be shut down. |
| -k | The unique connection number that you want to terminate. (Use the **emadmin list** command for a list of connections.) |
| -p | The password of the EMSRV user (the account used to start EMSRV). If you do not provide the password, you will be prompted for it. |
| -P | Specifies the port that EMSRV is using. The default port number is 4800. |

### Example

To stop the repository server on an IP host called teamserv, which was started with the password "secret", issue the following command:

```
emadmin stop teamserv -p secret
```

**RELATED CONCEPTS**

The repository server (EMSRV)
EMSRV user

**RELATED TASKS**

Stopping the repository server
Stopping a client connection

**RELATED REFERENCES**

The EMADMIN utility - overview